

**REPORT OF THE PROJECT :**  
**IDENTIFICATION OF SELECTION CRITERIA FOR**  
**NATIONAL TALENT—AN EXPLORATORY STUDY-I**  
**(SPONSORED BY NCERT)**

CONDUCTED AT  
DEPARTMENT OF EDUCATION  
PANJAB UNIVERSITY  
CHANDIGARH

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## CONTENTS

<u>CHAPTER</u>		<u>PAGES</u>
I	INTRODUCTION	... 1-10
II	METHOD AND PROCEDURE	... 11-24
III	RESULTS AND DISCUSSION-I Analysis of data pertaining to potential cognitive and non-cognitive variables which discriminates between selected and non-selected.	... 25-51
IV	RESULTS AND DISCUSSION-II Cognitive and Non-cognitive correlates of measures employed in NTS examination.	... 52-60
V	SUMMARY CONCLUSIONS AND SUGGESTIONS	... 61-70
	BIBLIOGRAPHY	... 71-76

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## LIST OF TABLES

Table No.	Title	Page
2.1	Number of subjects taken for each of the four groups in the study from different schools	14
2.2	Codes for different measures of Cognitive Area (Intelligence and Creativity)	21
2.3	Codes for different variables of motivational factors	22
2.4	Codes for different measures of socio-economic factors	23
2.5	Codes for different scores on NTS examinations	24
3.1	F-ratios for the variables having significant and approaching significant (AS) values	26
3.2	F-ratios for the variables having insignificant F-values	28
3.3	t-ratios between group I and II for the variables of verbal and non-verbal intelligence, $V_{F-T}$ , $V_{X-T}$ , $V_{O-T}$ , $V_{cy-T}$ , $NV_{F-T}$ attitude towards science, for interests in economics, outdoor physical activities, secretariate, scientific and for the traits B,D,G,H and J.	32
3.4	t-ratios between group I and III for the variables of verbal and non-verbal intelligence, $V_{F-T}$ , $V_{X-T}$ , $V_{O-T}$ , $V_{cy-T}$ , $NV_{F-T}$ , attitude towards science, for interests in economics, outdoor physical activities, secretariate, scientific and for the traits B,D,G,H and J.	34
3.5	t-ratios between Groups I and IV for the variables of verbal and non-verbal intelligence, $V_{F-T}$ , $V_{X-T}$ , $V_{O-T}$ , $V_{cy-T}$ , $NV_{F-T}$ , attitude towards science, for interests in economics, outdoor physical activities, secretariate, scientific and for the traits B,D,G,H and J.	36
3.6	t-ratios between Group II and III for the variables of verbal and non-verbal intelligence, $V_{F-T}$ , $V_{X-T}$ , $V_{O-T}$ , $V_{cy-T}$ , $NV_{F-T}$ , attitude towards science, for interests in economics, outdoor physical activities, secretariate, scientific and for the traits B,D,G,H and J.	39
3.7	t-ratios between the Group II and IV for the variables of verbal and non-verbal intelligence, $V_{F-T}$ , $V_{X-T}$ , $V_{O-T}$ , $V_{cy-T}$ , $NV_{F-T}$ , attitude towards science, for interests in economics, outdoor physical activities, secretariate, scientific and for the traits B,D,G,H and J.	41



List of table contd:

4.1	Correlations between predicted variables of intelligence, creativity and motivational with each of the three NTS examination scores	53
42	Correlation of NTS examination (GMA, SAT and Int.) with Socio-Economic-Scale.	58

## LIST OF FIGURES

Fig. No.	Title	Page
1.	Graph of means for non-verbal intelligence	43
2.	Graph of means for verbal intelligence	43
3.	Graph of means for verbal creativity on fluency	43
4.	Graph of means for verbal creativity on flexibility	44
5.	Graph of means for verbal creativity on originality	44
6.	Graph of means for verbal creativity in total	44
7.	Graph of means for non-verbal creativity on fluency	45
8.	Graph of means for scientific attitude	45
9.	Graph of means for interest in economics	45
10.	Graph of means for interest in secretariate	46
11.	Graph of means for interest in Out Door Physical Activities	46
12.	Graph of means for scientific interest	46
13.	Graph of means for Factor B of HSPQ	47
14.	Graph of means for Factor D of HSPQ	47
15.	Graph of means for Factor G of HSPQ	47
16.	Graph of means for Factor H of HSPQ	48
17.	Graph of means for Factor J of HSPQ	48



## CHAPTER I

### INTRODUCTION

It is not possible for nations, in this era of science and technology, to depend solely upon quantity of manpower as the complex society of tomorrow would need high quality personnel specially talented persons to cope with the vital problems. Identification and nurturing of Talent has been the outcome of two major world trends: to explore natural resources through best of the human resources (talented persons) in diverse areas of human activity such as medicine, engineering, agriculture etc. and to cultivate an aesthetic climate through talented products such as painting, music, poetry and the like to nullify the effects of the stresses and strains of the highly complex technology.

For these reasons identification and nurturing of talent has remained a major concern in all the progressive countries. Some children of great intellectual ability become very productive adults, many others of equal potential, however, do not fulfil the promise of their youth to the satisfaction of either themselves or society. India wastes much of its talent primarily because many of its brightest youth do not secure the admission, education and guidance that would enable them to work at levels for which they are potentially qualified.

To avoid such a wastage of potential youth in India, National Council of Educational Research and Training undertook<sup>a</sup> programme of talent search in science soon after its establishment in 1961, Chief objective of the scheme was to



yardstick by which other measures tentatively advanced as predictors or manipulators are evaluated, so establishment of criteria is fundamental problem in this field. The validity of selection procedures will depend upon the exactness of criteria taken. Speaking in terms of classical model even the best possible vehicle (tools) may lead nowhere till one knows where to drive that is which criteria to measure.

Hence finalizing of criteria for the selection of talent involves complexities arising out besides others two major points: (i) The quagmire of problems related to nature and content criteria itself and (ii) the definition of the term 'Talent'.

The problem of criteria, in a sense, how to identify the talented worth of the product of the individual gives rise to certain basic issues centering around.

- (i) Cognitive and Non-cognitive (Guilford, 1950, Mackinnon, 1962)
- (ii) Single criteria and multi criteria (Taylor and Ellison, 1972).
- (iii) Individual and Societal as focal to criterion, (Yamamoto, 1964)

Bragden and Taylor (1950) refer to the complexities arising out of basic effects characterized by:

- (i) Criterion deficiency (omitting important elements).
- (ii) Criterion distortion (Improper weighing in comparing criterion elements).
- (iii) Criterion contamination (Introducing extraneous elements).

Complexities of the task of demarking nature and content of criteria in the identification of talent is further



borne out by the very complex nature of talent. De-Haan and Havighrurst (1961) hold that Talented (gifted) children are those individuals from kindergarten through high school age who show unusual promise in some useful area and whose talents might be stimulated, Norma E Cutts and Nicholas Moseley (1957 ) describe talented as all pupils who show unusual ability along non-academic lines and are capable of profiting from advanced instruction and of making a career in their special field.

Conceivably, the talented individual basically show a superior intellect, separately or in combination with, a talent in such areas as art, music, social leadership, mechanical ability, foreign languages, science, mathematics, dramatics and creative writing.

Sub-committee (set up by NCERT) has tried to give comprehensive definition of Talent. It reads as "Talent is a potentiality that manifests itself in a level of socially relevant performance in one or more specialized areas. Such potentiality may be indicated by a pattern of intellectual, psychomotor, motivational and personality characteristics related to socio-cultural environment" (R. f. R-view Committee, p.9).

✓ In attempts to unravel the complex determinants of talent, early work concentrated on intelligence. Intelligence is no doubt the most important component of talent. Voluminous research work in the past has established that talented performance depends to a great extent on intelligence studies by Terman and others (1925), Hollingworth and Cobb (1923)



Carroll (1930, Sanford (1952), Wedemeyer (1953), Gowan (1951), Hammond and Cox (1967) and several others have reported that superior intelligence is associated with high academic achievement. High intelligence accounts for superior problem solving abilities, affective work habits, independent thinking and desirable behavioural characteristics leading to high academic achievement. Hence utilization of intelligence quotient or sources on intelligence test has been the most popular method for the designation of giftedness/talented in the past. It is only very recently that the need for other factors than intelligence which may help identifying talented has been felt. Intelligence alone is not enough for effective intellectual work. It could be that children with creative mind not have high intelligence and so many scorers would not be identified. Getzels and Jackson (1962) clearly indicate need for expanding the present concept of giftedness/talented. In their experiments they compared two groups of children who were referred to as highly intelligent and another group known to as highly creative. Despite 23 points I.Q. difference in their mean scores, both groups were equally superior, in school achievement. Determination of giftedness from an I.Q. score alone may eliminate many creative individuals who are potentially superior. Some supporting data are shown in the thirty five years follow-up of the Terman group (1954) all who were selected on the basis of I.Q., not one of the group has become creative artists. The distinguishing feature between creative and conventional



intelligence can be understood in the light of the fact that the former essentially involves the capacity to invent and innovate, whereas the latter requires rather the reproduction of the already learnt material. Support to this argument has come from the studies like Guilford (1950), Guilford and Chislein (1958), Merrifield (1960), McCurie et al (1961), Sultan (1962), Jackson (1962), Torrance (1963), Anderson (1964) and Cropley (1965 and 1966).

Burt (1962 and 1964) argues that creative production may chiefly be attributed to the operation of general ability. Katchan and Kheiralla, 1962; Lovell and Shields, 1967; Ginzberg and Whitemore, 1968 also support this view, yet threshold hypothesis (Anderson, 1960), too establishes the independence of creativity from intelligence beyond a certain level of intelligence. Meer and Stein (1955); Barron (1961), Torrance (1962); Taylor (1964), Vernon (1964); Yamamoto (1964b), too subscribe to this point of view, and Barron (1969) reported that a specific minimum I.Q. was probably necessary for certain intrinsically creative activities in order to engage in the activity at all, creativity becomes independent of intelligence. This enforced the need for considering both the variables.

The significance of non-cognitive factors in identifying the special characteristics of the gifted/talented has been recognized by Terman (1954). He emphasized that the special characteristics of talented men prevade not only cognitive modes but also temperamental and even moral spheres. <sup>Getzel and</sup> Jackson (1962)



concluded that the distinction between highly intelligent adolescents is not confined to the cognitive spheres but it embraces the temperament characteristics as well. In the present study personality, motivation socio-economic status have been taken.

Intellectually or creatively, talented individuals are different from others in the sense that they have unique personality characteristics conducive to worthwhile production. Broadbent (1958), Lynn (1959) and Lynn and Gordan (1961) found a low and positive correlation between intelligence and introversion.

Creativity has been found to be associated with the personality characteristics of the individual. Wallach and Kogan (1965) found significant interaction between personality and creativity. Freeman et al (1969) point out that differences in creativity seem likely to be related more to non-cognitive than cognitive traits. Golann (1963) attaches so much importance to personality variables that <sup>he</sup> uses these variables as criteria in the study of creativity. Likewise, Dellas and Gaier (1970) argue that attempt to understand creativity without referring to the personological context would be a futile exercise. Considerable research efforts have been directed to identify the personality characteristics of different creative persons. The studies of Roe (1951, 53), Cattell (1954, 1963), Cattell and Drevdahl (1955), Torrance (1962) Mackinnon (1962 and 1970), Taft and Gilchrist (1970), Foster (1971), Halpin et al (1974) and many more reveal that certain personality characteristics



are associated with specific groups such as artists, scientists and agriculturists. Cattell (1954, 1963) found that scientific researchers are generally found to be schizothyme, withdrawn, skeptical, internally pre-occupied, precise and reliable. The average level of ego-strength and emotional stability is distinctly higher for the scientific researcher than for the general population.

In view of the pronounced relationship between cognitive dimensions and personality, it is worthwhile to explore whether personality characteristics have their validity in determination of talent.

For any potential 'Talent' to be expressed in product the importance of motivation cannot be denied. Motivation refers to the need to excel the standards of excellence in any given area. Various motivational tendencies (attitude, interest and achievement motivation) operate with differing weights from one person to another (Frank, 1967). ~~Tanburi~~ (1978) in his study on intellectually gifted children has indicated that they were more achievement oriented than were oriented towards creative activities. Hence motivational factors like interest, achievement motivation, attitude can be considered as potent factors in the performance of one's talent.

To make creative contributions in a scientific or scholarly field one must also be endowed with interest in it, industry, persistence, strength of character, confidence and some spark of originality. The psychologist, Ann Roe studied sixty



of the most eminent scientists in the United States and found that they varied in intelligence considerably but the common thing in them was the intense interest. Jacobson (1942) also concluded while studying interest patterns and achievement in medical schools that those who were characterized by scientific interests were more successful students. O'Shea (1968) Katz and Norris (1972) in their studies have obtained interest as potent factor in the performance of area of one's talent. The social environment in which a child grows has a decisive influence on the development of any potential talent and its expression into a product.

The organism with whatever capabilities, capacities has to operate within a particular environment. Talent may best be actualized within favourable environment whereas indifferent and hostile conditions may inhibit it. Environmental conditions conducive to creative behaviour may be referred to as psychological safety and psychological freedom, socio-cultural influences and increased creativity through education. Torrance (1965) found that the creative individual needs to learn to accept inevitable limitations in the environment while yet holding to his purposes and reaching for the expression of his talent. Studies by Rivlin (1959), Nuss (1962) and Hudson (1966) indicate that high creatives generally come from higher socio-economic class groups.

The present project attempted to explore such a set of variables as could serve the best possible criteria in



identifying the National Talent.

Objectives:

1. To study the differential pattern of variables related to selected and non-selected groups in NTS scheme.
  2. To study the relationship of intellectual personality and motivational variables as identified potential for discriminating awardees and non-awardees, so as to ascertain the validity of these variables.
  3. To give suggestions as to which of the variables may be taken care of in NTS examinations so as to increase the reliability and validity of NTS examinations.
- Since the study was exploratory no specific hypotheses were formulated*



## CHAPTER II

### METHODS AND PROCEDURES

#### 2.1 Design

In the first part of the project simple one way analysis of variance design was used for the purpose of screening out those criterion variables with a view to identifying those variables wherein the NTS selected and non-selected groups differed significantly. The criterion variables broadly divided into cognitive and non-cognitive areas, involved forty-four scores namely, two on intelligence; five on non-verbal creativity, four on verbal creativity; two from Eysnack personality Inventory, fourteen from 14PF; ten from Interest Inventory, five on socio-economic scale; and one set of scores on each of scientific attitude and achievement motivation.

The variables thus identified significant and approaching significant values have been retained in the second part of the study which employs a correlational design with a view to further determine validity of identified criterion. Thus scores obtained on the variables - verbal and non-verbal intelligence, ~~four dimensions of verbal and non-verbal intelligence~~, four dimensions of verbal creativity namely - fluency, flexibility, originality totals and summative totals, fluency totals of non-verbal creativity, scientific attitude; personality traits of B,D,G,H,J as also



interests in science, economics, outdoor physical activities, sectarianism have been correlated with those obtained in NTS theory examinations as well as in interview for the group of awardees (Group I) and those who could not qualify interview (Group II) only.

## 2.2 Sample

As the population appearing in NTS examination is spread all over India, it was not possible, in a small study of exploratory type planned to finish during one year time, to include all states and Union territories of India for the purpose of sampling. Hence depending mainly on the twin criterion of feasibility of data collection and limited geographical area, the sample was limited to students of Delhi who studying in XI class, appeared in tenth class in the year, 1979. The sample comprised of the following four groups (i) of NTS awardees who were selected by NTS, Unit of NCERT, on the basis of written tests (Scholastic Aptitude Test and General Mental Ability Test) and interview.

(ii) the second group consisted of those students who qualified the written examinations; but were rejected in interview.

(iii) the third group consisted of students who appeared in written tests but could not qualify it, hence also did not appear in the interview.

(iv) fourth group served as a control group, the students belonging to this group did not appear in the written test



of NTS, but were studying in those very schools to which students of Group I, II and III belonged.

Thus Group I and II were included on the basis of purposive sampling, whereas third and fourth were chosen randomly from the same schools, from where the students of group first and second were taken. Number of students in Group I, II, III and IV was 43, 31, 54 and 45 respectively.

Sixty-nine awardees and fifty-one subjects rejected in interview belonged to Delhi as is indicated in the lists obtained from NTS Unit. These two groups of students were scattered in the thirty-six different schools of Delhi. Efforts were made to approach each and every subject in all the thirty-six schools, except for a few schools having only one subject in Group I and II. One school having good number of awardees and those rejected in interview had also to be left because of the non-cooperation given by school authorities in spite of the repeated requests made by NTS Unit and the research scholar. In all 60 awardees and 38 who could not get through the interview were approached but data of 43 and 31 students of respective groups could be collected because of the incomplete data-sheets on the first visit to these schools, the student could not be contacted or because of non-cooperation of the school,

The chart indicating number of awardees and candidates who were rejected in interview along with the number of subjects taken in the study for each of the four groups is presented in Table 2.1. Number of students joining or



or leaving the school is represented in parentheses.

14

Table 2.1 Number of subjects taken for each of the four groups in the study from different schools

S. No.	Name of the School	No. of award-ees	No. of Ss rejected in interview	Number of subjects taken for Group			
				I	II	III	IV
1	2	3	4	5	6	7	8
1.	St.Xavier School	8 (1 left)	3	7	5	4	4
2	Springdales	4	4	4	4	2	1
3	Salwan Public School	1	2 (1 left)	1	1	7	2
4	St.Columba's School	5 (1 left)	2	4	2	2	2
5	Delhi Public School, R.K.Puram	7 (3 left) (4 joined)	2 (2 left) (1 joined)	8	1	4	3
6	Bal Bharti Air Force Central School	5 (1 left)	3 (3 left)	4	4	5	5
7	Central School, IIT	1	1 (1 left)	1	-	3	1
8	Convent of Jesus and Mary	2	2 (1 left)	2	1	3	1
9	Bhavan's Mehta Vidyala	2	1	2	1	5	6
10	Frank Anthony Public School	3 (1 left)	2	2	2	3	3
11	Delhi Public School, Mathura Road	3 (1 left)	3	2	3	3	3
12	Modern School, Barakhamba Road	7 (3 left)	2	4	2	3	3
13	Kendriya Vidyala R.K.Puram	1	2	1	2	-	-
14	Mother's International School	1	1	1	1	-	-
15	NDMC Navyug School	-	2	-	2	1	1
16	DTEA Hr.Sec.School	-	2	-	2	2	2
17	Ramjas Hr.Sec.School	-	2	-	2	2	2

contd..



1	2	3	4	5	6	7	8
18	Manvasthali School	1	-	-	-	2	3
19	The Air Force Central School	2	1	-	-	-	-
20	Queen Mary's School	1	-	-	-	-	-
21	Kendriya Vidyalaya INA Colony	1	-	-	-	-	-
22	Govt. Boys Hr. Sec. School No. 2, Rajori Garden	1	-	-	-	-	-
23	Sardar Patel Vidyalaya	3	2	-	-	-	-
24	Kendriya Vidyalaya	1	-	-	-	-	-
25	Hans Raj Model School	1 (left)	-	-	-	3	2
26	Modern School, Vasant Vihar	1	-	-	-	-	-
27	Carmel Convent School	5 (4 left)	1	-	-	-	-
28	KESS School	1	1	-	-	-	-
29	Cambridge School	-	1	-	-	-	-
30	Kendriya Vid. Sadar Bazar	-	1	-	-	-	-
31	Don Bosco	-	1	-	-	-	-
32	Govt. Hr. Sec. School, R.K. Puram	-	1	-	-	-	-
33	Loreto Convent School	-	1	-	-	-	-
34	Lady Irwin Hr. Sec. School	-	3 (2 left)	-	-	-	-
35	DLH Kannada School	-	1	-	-	-	-
36	Govt. Model School, Ludlow Castle	-	1	-	-	-	-
Total		69	51	43	31	54	45

✓



### 2.3 Tools:

The need to use multiple criteria (Fligler, 1961; Hildreth, 1966; Butcher, 1968; Hoyles Wicks, 1975) in selection is emphasized as this can reduce the number of those not identified. To cover different dimensions of Talent as outlined in Chapter 1, tools were finalised after:

- (i) obtaining information regarding the procedure (for searching talent) used in various countries other than India on the basis of postal correspondence with those countries;
- (ii) Reviewing tools as used by different researchers related in the problems of identification and correlates of talent.
- (iii) Consultation with experts working in the area of Talent particularly those in the NTS Unit of NCERT. The name of Prof. R.G. Misra may particularly be mentioned whose advice was sought to incorporate his valuable suggestions emerging out of his active participation in and outstanding experience, in the selection of talented students through NTS Unit, as also the follow-up of their work.



### Criterion-wise statement of Tools:

To explore and finalize criteria as related to cognitive and non-cognitive dimensions of talents the following tools were used:

I Cognitive: Two major cognitive dimensions namely creativity and intelligence were taken up.

(i) Test of General Mental Ability (Jalota, 1963; Hindi version).

(ii) Standard Progressive Matrices (Raven, 1958).

(iii) Torrance Test of Creative Thinking (Verbal Form I; 1966).

(iv) Torrance Test of Creative Thinking (Figural Form II, TTCT; 1966).

II Non-cognitive: To measure (A) motivational (B) personality and (C) socio-economic variables, following tests were included:

#### A. Motivational:

(i) Test of Attitude Towards Science (Miachel, Ford II).

(ii) NCERT Interest Inventory (adapted by taking first fifty questions of Junior Form and first fifty questions of senior form).

(iii) Test of Achievement Motivation and Anxiety Inventory (Mehta, 1976).

#### B. Personality:

(i) Eysneck Personality Inventory (Eysneck and Eysneck, 1964).

(ii) Jr.Sr.High School Personality Questionnaire (Cattell, 1963).

#### C. Socio-Economic.

D. Dev Mohan Socio Economic Scale (1972).

### 2.4 Data Collection:

The data was collected in three sessions— first one month and rest two small sessions of seven days each,



depending upon the appointments with the school authorities. Completion of all the tests required about four to five hours depending upon the individual subjects. So on average about one and a half days were spent on each of the schools in addition to the time spent in following up some respondents to get their tests completed.

Research-scholar approached fifty-nine awardees of the group I and forty-three candidates qualifying written tests only (but rejected in interview) of group II, but because of dropouts, repeated absences and other miscellaneous reasons, could collect complete data from forty-three awardees in the first group and thirty one out of forty-three (approached) rejected in interview; i.e. group II. To begin with sixty students in group III as also in group IV were included for collection of data. Because of reasons already mentioned for group I and II only fifty-four of group III and forty five of group IV were retained for the purposes of analyses.

As all the tests mentioned under Section 2.3 were group tests, these were administered in different sessions to subjects in groups of ranging between either 2-5 (under Gr. I and II) or even 15-20 (in sub-sample III, IV) in their classes in accordance with the instructions for administration given in the respective test manuals. Students were strictly supervised to check cheating. The level of their motivation was sustained by reply in affectionate, when and wherever students enquired if they could know the marks afterwards.



Hand scoring was done by using separate scoring keys for group test of General Mental Ability, Standard Progressive Matrices. 10<sup>4</sup>PF; Eysneck Personality Inventory, Test of Attitude Towards Science, Achievement Motivation and Anxiety Inventory; Dev Mohan's Socio Economic Scale, Scoring for Interest Inventory was computerized from Regional Computer Centre, Chandigarh. Test of creativity in both verbal and non-verbal creativity Test Batteries were scored strictly according to the instructions given in the respective test manuals.

In the present investigation, raw scores on intelligence were taken up as such for analysis of data. In case of verbal test of creativity, scores for fluency totals, flexibility totals, originality totals, and creativity totals were obtained by adding respective scores on all the activities. Similarly scores on fluency, flexibility, originality, elaboration and creativity totals were obtained on all the Complete Figural Test Battery.

Eysneck Personality Inventory provided two scores on the personality characteristic of neuroticism and extroversion. Scores on fourteen personality traits namely, Sizothymia-Affectothymia; low-intelligence — high intelligence; low ego-strength-high ego-strength; Phlegmatic-excitabile; submissive-dominant; desurgency-surgency; weak super-ego-strong super-ego strength; shy-venturesome, toughminded-tender minded; Zeppia-Coasthenia; Adquacy—self-sufficiency; Low ergictension-high ergic tension; as measured by 14 PF were used for analysis.



Scoring of Test of Attitude Towards Science was based on Likert Scale. The alternative responses credited 3,2 and 1 respectively from the favourable to the unfavourable end. The sum of the item credits represented the individual's total score on it.

Scoring of Interest-Inventory being laborious was done with the aid of computer. Score of each interest was multiplied with respective loading as indicated in the manual. The scores so obtained were converted into standard scores.

Achievement values and Anxiety Inventory yielded four scores (i) the number of achievement related responses (AR) (ii) True responses (TR) (iii) Unrelated responses (UR), (iv) the total score (AVAI) which was obtained by subtracting number of unrelated responses from number of achievement related responses  $AVAI = AR - UR$ . This score was retained for analyses.

Scores on five areas in respect of educational occupational and social status; per capita income of the family and the total of all these four were obtained from the Dev Mohan's Socio-Economic Scale( 1972 ).

Thus in all forty-four sets of scores including two sets of scores on intelligence; nine on creativity; sixteen on personality; ten on interest, five on SES and one on each of achievement motivation and attitude towards science were retained for the purpose of analyses. These scores were used as representing independent variables in the analyses of data.



2.5 The codes in respect of all variables are entered in Table 2.2 to 2.5 below:

Table 2.2 Codes for different measures of cognitive area (Intelligence and Creativity)

Sr. No. of Tests	Description of Measures	Codes
1	Intelligence 1	
1	Total score on test of <del>attitude towards science</del> <sup>General Mental Ability (Jalota)</sup>	V <sub>Int</sub>
2	Total score on Raven's Progressive Matrices	NV <sub>Int</sub>
	Creativity	
	Test of Non-verbal Creativity Form A	
3	Creativity totals on Picture Construction Activity-I	NV <sub>CY-1</sub>
4	Creativity total on Incomplete Figure Activity-2	NV <sub>Cy-2</sub>
5	Creativity totals on Repeated Figures Activity-3	NV <sub>Cy-3</sub>
6	Creativity totals on Complete Test Battery	NV <sub>Cy-4</sub>
7	Fluency on Complete Test Battery	NV <sub>F-T</sub>
8	Flexibility on Complete Test Battery	NV <sub>X-T</sub>
9	Originality on Complete Test Battery	NV <sub>O-T</sub>
10	Elaboration on Complete Test Battery	NV <sub>E-T</sub>
11	Test of Verbal Creativity 'Form A'	
11	Fluency on Complete Test Battery	V <sub>V<sub>F-T</sub></sub>
12	Flexibility on Complete Test Battery	V <sub>X-T</sub>
13	Originality on Complete Test Battery	V <sub>O-T</sub>
114	Creativity totals on Ask-and Guess Activity-1	V <sub>Cy-1</sub>
15	Creativity totals on Ask-and Guess Activity-2	V <sub>Cy-2</sub>
16	Creativity totals on Ask-And Guess Activity-3	V <sub>Cy-3</sub>
17	Creativity totals on Product Improvement Activity-4	V <sub>Cy-4</sub>
18	Creativity totals on Unusual Uses Activity-5	V <sub>Cy-5</sub>

contd..



Table 2.2 contd:

19.	Creativity totals on Unusual Questions Activity-6	V <sub>Cy-6</sub>
20	Creativity totals on Just Suppose Activity-7	V <sub>Cy-7</sub>
21	Creativity totals on Complete Test Battery	V <sub>Cy-T</sub>

Table 2.3 Codes for different variables of motivational factors.

S.No. of Tests	S.No. of measure	Description of measure	Code
I		Test of Attitude Towards Science.	
	1	Total score on test of attitude towards science.	Att.Sc.
II		Interest Inventory	
	2	Interest in Economics	Eco
	3	Interest in sectariate	Sect
	4	Interest in legal administration	Lg.Ad
	5	Interest in technology	Tech
	6	Interest in Outdoor Physical Activities	Od.Ph.Act.
	7	Interest in science	Sc
	8	Interest in linguistic literature	Ling.Lit.
	9	Interest in Protective Services	Prt.Sc.
	10	Interest in Education	Ed
	11	Interest in medical	Md.
III		Test of Achievement Motivation and Anxiety Inventory:	
	12	Total score on test of Achievement values And Anxiety Inventory	AVAI
IV		Eysneck Personality Inventory	
	13	N uroticism	N
	14	Extroversion	Ext.

contd...



Table 2.3 contd:

23

V Jr.Sr. High School Personality Questionnaire		
15	Sizothymia-Affectothymia	A
16	Low Intelligence-High Intelligence	B
17	Low Ego-Strength-High Ego strength	C
18	Phlegmatic - Excitable	D
19	Submissive - Dominant	E
20	Desurgency - Surgency	F
21	Weak Superego - Strong Super Ego	G
22	Shy - Venturesome	H
23	Tough-minded-Tender minded	I
24	Zeppia - Coanthenia	J
25	Adequacy - Guilt proneness	O
26	Group Adherence - Self-Sufficiency	Q <sub>2</sub>
27	Low Integration - High Self Concept Control	Q <sub>3</sub>
28	Low Ergic-tensi. - High Ergic tension	Q <sub>4</sub>

Table 2.4 : Codes of different measures of Socio-Economic Status Factors.

S.No. of Measure	Description of measure	Code
Dev Mohan's Socio-Economic Scale		
1.	Educational status of the family	SES <sub>Ed</sub>
2	Occupational status of the family	SES <sub>Occ</sub>
3	Per capita income of the family	SES <sub>In</sub>
4	Social status of the family	SES <sub>SS</sub>
5	Total of educational, occupational per capita income, and social status	SES <sub>T</sub>



Table 2.5 : Codes for different scores on NTS examinations

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S.No.	Description of the measure	Code
1	General Mental Ability	GMA
2	Scholastic Aptitude Test	SAT
3	Interview	Int

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## RESULTS AND DISCUSSION-I

Directed towards the first objective of identifying correlates to screen out criterion variables wherein selected and unselected MTS awardees differed, F-ratios for all the forty-four variables — that is two variables of verbal and non-verbal intelligence, five variables of non-verbal creativity, four variables of verbal creativity, neuroticism, extroversion; fourteen personality traits as measured by 14PF; one set of scores each on scientific attitude and achievement motivation, ten areas of interest, five variables of socio-economic status for the following four groups were computed:

(I)awardees

(II) who qualified written tests but were rejected in interview.

(III)who could not qualify written tests, and

(IV) who did not appear for the test.

One-way analysis of variance is a composite test that gives an overall idea about the significance of difference among several means. This technique made simple the work of computing so many t-values for four groups.

F-ratios for significant (and approaching significant values) have been demonstrated in Table 3.1 and insignificant values have been reflected in Table 3.2. Variables with insignificant values have not been discussed.

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\* Analysis of data pertaining to potential cognitive and non-cognitive variables which discriminates between selected and non-selected.



Table 3.1 : F-ratios for the variables having significant and approaching significant (AS) values

S. No.	Name of the Variable	Source of Variance	Sum of Squares	df	Mean Square Variance	F	Level of Significance
1	V <sub>Int</sub>	TSS	6400.00	171	374.275	2.095	AS
		WSS	61693.390	168	367.223		
		BSS	2307.160	3	769.203		
2	NV <sub>Int</sub>	TSS	11866.700	171	69.396	11.068	.01
		WSS	9908.380	168	58.978		
		BSS	1958.320	3	652.773		
3	V <sub>F-T</sub>	TSS	66405.420	171	388.336	5.887	.01
		WSS	60089.000	168	357.673		
		BSS	6316.420	3	2105.473		
4	V <sub>X-T</sub>	TSS	20500.120	171	119.884	7.306	.01
		WSS	18134.380	168	107.943		
		BSS	2365.740	3	788.580		
5	V <sub>O-T</sub>	TSS	10807.320	171	115.832	9.270	.01
		WSS	16994.085	168	101.155		
		BSS	2813.235	3	937.745		
6	V <sub>Cy-T</sub>	TSS	277536.400	171	1623.020	7.356	.01
		WSS	245314.200	168	1460.203		
		BSS	32222.200	3	10740.733		
7	NV <sub>F-T</sub>	TSS	13893.630	171	81.776	2.462	AS
		WSS	13394.710	168	79.730		
		BSS	588.920	3	196.307		
8	Att.Sc.	TSS	16107.660	171	94.197	2.717	.05
		WSS	15362.370	168	91.443		
		BSS	745.290	3	248.430		
9	Eco.	TSS	16999.840	171	99.999	3.724	.01
		WSS	15933.990	168	95.1431		
		BSS	1065.850	3	355.2833		
10	Soc. Sci.	TSS	17002.190	171	100.0128	2.669	.05
		WSS	16224.020	168	97.1498		
		BSS	778.170	3	259.390		
11	Order Phy	TSS	16999.860	171	99.999	5.857	.01
		WSS	15381.560	168	92.105		
		BSS	1618.300	3	539.433		
12	Sci	TSS	16999.990	171	99.999	5.724	.01
		WSS	15414.780	168	92.304		
		BSS	1585.210	3	528.403		

TABLE CONTD:...



Table 3.1 contd:

S. No.	Name of the Variable	Source of Variance	Sum of Squares	df	Mean Square Variance	F	Level of Significance
13	B	TSS	619.692	171	3.624	3.016	.05
		WSS	588.022	168	3.500		
		BSS	31.670	3	10.577		
14	D	TSS	1903.878	171	11.134	2.256	AS
		WSS	1830.137	168	10.894		
		BSS	73.714	3	24.580		
15	G	TSS	1503.413	171	8.792	4.660	.01
		WSS	1387.907	168	8.261		
		BSS	115.506	3	38.503		
16	H	TSS	2729.187	171	15.960	2.098	AS
		WSS	2630.637	168	15.659		
		BSS	98.550	3	32.850		
17	J	TSS	1487.320	171	8.698	3.600	.05
		WSS	1397.487	168	8.318		
		BSS	89.833	3	29.944		

Value of F ( 168,3 ) =  $\frac{2.657 \text{ at } .05}{3.90 \text{ at } .01}$



Table 3.2: F-ratios for the variables having insignificant values

28

S. No.	Name of the variable	Source of Variance	Sum of Squares	df	Mean square variance	F
1	NV <sub>X-T</sub>	TSS	6204.437	171	32.283	1.201
		WSS	6074.158	168	36.156	
		BSS	130.279	3	43.426	
2	NV <sub>O-T</sub>	TSS	26781.980	171	156.620	1.0913
		WSS	26270.000	168	156.369	
		BSS	511.980	3	170.660	
3	NV <sub>E-T</sub>	TSS	27671.610	171	161.822	0.100
		WSS	27622.220	168	164.418	
		BSS	49.390	3	16.463	
4	NV <sub>Cy-T</sub>	TSS	207714.80	171	1214.706	0.687
		WSS	205198.80	168	1221.421	
		BSS	2516.00	3	932.667	
5	AVAI	TSS	3596.250	171	21.031	0.286
		WSS	3577.974	168	21.297	
		BSS	18.276	3	6.092	
6	LgAd	TSS	302.470	171	1.7792	1.572
		WSS	294.160	168	1.7614	
		BSS	8.310	3	2.7700	
7	Tech	TSS	16398.410	171	99.9906	1.943
		WSS	16424.840	168	98.3523	
		BSS	573.570	3	191.900	
8	Ling.Lit	TSS	16999.870	171	99.9992	1.2873
		WSS	16615.610	168	99.4946	
		BSS	384.260	3	128.0866	
9	Prt.Sc	TSS	16999.8500	171	99.991	1.4625
		WSS	16564.640	168	99.1894	
		BSS	435.210	3	145.0700	
10	Ed	TSS	16999.020	171	99.9942	0.2131
		WSS	16934.170	168	101.4022	
		BSS	64.850	3	21.6166	
11	Md	TSS	16999.390	171	99.9964	0.3902
		WSS	16881.050	168	101.0841	
		BSS	118.340	3	39.4466	

contd....



Table 3.2 contd:

29

S. No.	Name of the Variable	Source of Variance	Sum of Squares	df	Mean square variance	F
12	N	TSS	3449.367	171	20.172	
		WSS	3409.695	168	20.296	0.652
		BSS	39.672	3	13.224	
13	Ext.	TSS	3204.437	171	18.739	
		WSS	3171.294	168	18.877	0.585
		BSS	33.143	3	11.048	
14	A	TSS	1924.948	171	11.257	
		WSS	1893.323	168	11.270	0.935
		BSS	31.625	3	10.542	
15	C	TSS	2178.768	171	12.741	
		WSS	2130.756	168	12.683	1.262
		BSS	48.012	3	16.004	
16	E	TSS	1542.442	171	9.020	
		WSS	1526.640	168	9.087	0.580
		BSS	15.802	3	5.267	
17	F	TSS	1926.628	171	11.267	
		WSS	1922.317	168	11.442	0.126
		BSS	4.311	3	1.437	
18	I	TSS	1889.187	171	11.048	
		WSS	1871.222	168	11.138	0.538
		BSS	17.965	3	5.988	
19	O	TSS	2352.995	171	13.760	
		WSS	2315.676	168	13.784	0.902
		BSS	37.319	3	12.440	
20	Q <sub>2</sub>	TSS	1529.698	171	8.946	
		WSS	1502.663	168	8.944	1.008
		BSS	27.035	3	9.012	
21	Q <sub>3</sub>	TSS	1497.041	171	8.755	
		WSS	1449.727	168	8.629	1.828
		BSS	47.314	3	15.771	
22	Q <sub>4</sub>	TSS	2054.419	171	12.014	
		WSS	2030.062	168	12.084	0.672
		BSS	24.357	3	8.119	

table contd...



Table 3.2 contd:

30

S. No.	Name of the Variable	Source of Variance	Sum of Squares	df	Mean square variance	F
23	SES <sub>Ed</sub>	TSS	11634.675	171	68.039	1.593
		WSS	11312.812	168	67.338	
		BSS	321.863	3	107.288	
24	SES <sub>Occ</sub>	TSS	7330.669	171	42.869	0.450
		WSS	7272.170	168	43.287	
		BSS	58.499	3	19.499	
25	SES <sub>in</sub>	TSS	576.241	171	3.370	0.106
		WSS	575.1147	168	3.423	
		BSS	1.094	3	0.365	
26	SES <sub>SS</sub>	TSS	45579.930	171	266.549	0.378
		WSS	45274.290	168	269.489	
		BSS	305.640	3	101.880	
27	SES <sub>T</sub>	TSS	12739.200	171	744.972	0.993
		WSS	125171.300	168	745.067	
		BSS	2218.900	3	739.633	



F-ratios for the variables of non-verbal intelligence; four dimensions of verbal creativity namely —  $V_{F-T}$ ,  $V_{X-T}$ ,  $V_{O-T}$  and  $V_{cy-T}$  scientific attitude, interests in economics, secretariate, outdoor physical activities, and scientific, traits B, G and J of HSPQ were significant while for the variables verbal intelligence;  $NV_{F-T}$ , traits D and H of HSPQ were of approaching significant value. For these variables t-ratios were also computed which have been represented in Tables 3.3-3.7, while discussing the groups in pairs namely - Groups I and II, I and III, I and IV, II and III, II and IV.

Group I (Awardees) and II (rejected in interview)

These two groups of students do not differ on the variables of verbal and non-verbal intelligence, verbal and non-verbal creativity, attitude towards science, interest in economics, secretariate and scientific as also for the traits B, G and H (vide Table 3.3). However, significant difference between groups I and II were observed for the variables of interest in outdoor physical activities ( $t = 2.128$ ) personality traits D ( $t = 2.346$ ) and J ( $t = 3.072$ ).



Table 3.3 t-ratios between groups I and II for the variables of verbal and non-verbal intelligence,  $V_{F-T}$ ,  $V_{X-T}$ ,  $V_{O-T}$ ,  $V_{Cy-T}$ ,  $NV_{F-T}$  attitude towards science, traits B,D,G,H and J and for the interests in economics, outdoor physical activities, secretariat and scientific .

S. No.	Name of the Variable	Group I		Group II		Mean Difference	t-ratio
		Mean	SD	Mean	SD		
1	V. Int	68.837	26.377	75.581	21.172	-6.744	1.175
2	NV Int	56.372	2.870	54.710	4.893	3.205	1.834
3	$V_{F-T}$	42.419	17.966	46.419	20.670	-4.000	0.88
4	$V_{X-T}$	29.326	9.293	29.097	9.769	0.229	0.102
5	$V_{O-T}$	21.837	10.902	21.645	11.519	0.192	0.073
6	$V_{Cy-T}$	93.256	38.058	96.645	39.723	-3.389	0.371
7	$NV_{F-T}$	28.186	8.958	28.032	8.894	0.154	0.073
8	Sc Attid	49.323	8.914	51.645	4.806	-2.322	1.315
9	Eco	45.058	8.616	48.007	11.005	-1.314	0.416
10	Sect.	47.636	8.602	47.964	7.320	-0.328	0.172
11	Ot dr Phy	44.841	11.510	50.277	9.825	-5.436	2.128*
12	Sc.	53.428	9.356	51.699	8.803	1.729	0.803
13	B	8.116	1.721	7.581	2.126	0.535	1.196
14	D	10.837	3.618	9.032	2.689	1.805	2.346*
15	G	11.791	3.020	12.677	2.856	-0.886	1.274
16	H	10.163	4.304	11.742	3.966	-1.579	1.6
17	J	9.558	2.519	7.419	3.472	2.139	3.072**

Group I endowed with traits J ( $M_I=9.558$ ,  $M_{II}=7.419$ ) and D( $M_I=10.837$ ,  $M_{II}=9.032$ ) showing that the awardees were reflective, intellectually and physically fastidious, prefers to do things of their own (J+) and were self-assertive, excitable, overactive (D+). These characteristics might have helped the students in taking



up interview with confidence in a face to face situation evoked by interviews.

However, Group II students having low score on D and J showing they were inactive, stodgy (D-) and vigorous, zestful (J-). Perhaps because of these characteristics their performance in interview was not upto the mark. Further these students being more interested in outdoor physical activities in comparison to Group I ( $M_I=44.841$ ,  $M_{II}=50.277$ ) could not pay full attention to their academic subjects and make full use of their intellectual ability.

Group I (awardees) and III (who could not qualify written test).

The results in Tables 3.4 indicate that performance of Group I, the awardees was significantly better on non-verbal intelligence ( $t = 2.92$ ;  $M_1=56.372$ ,  $M_3=53.167$ ); flexibility ( $t=2.59$ ;  $M_1=29.326$ ,  $M_3=23.463$ ) originality ( $t = 2.744$   $M_1=21.837$ ,  $M_3= 15.816$ ), creativity totals ( $t = 2.268$ ;  $M_1=93.256$ ,  $M_3=74.426$ ) (verbal); On the other hand Group III was significantly better than group I on verbal intelligence ( $t = 2.223$ ;  $M_1=68.837$ ;  $M_3=78.019$ ) and in the interests in the areas of economics ( $M_1=45.058$ ,  $M_3=50.643$ ) and outdoor physical activities ( $M_1=44.841$ ;  $M_3=52.042$ ). On all other variables the performance of Group I and Group III was same.



Table 3.4 : t-ratios between Group I and Group III for the variables of verbal and non-verbal intelligence, ( $V_{F-T}$ ,  $V_{X-T}$ ,  $V_{D-T}$ ,  $V_{CY-T}$ );  $NV_{F-T}$ ; attitude towards science and for the interests in economics, outdoor physical activities, secretariate, scientific and for the traits B,D,G,H and J.

S. No.	Name of the Variable	Group I		Group III		Mean diff.	t	Level of Sig.
		Mean	SD	Mean	SD			
1	V Int	68.837	26.377	78.019	13.456	-9.182	2.223	.05
2	NV Int	56.372	2.870	53.167	8.797	3.205	2.92	
3	$V_{F-T}$	42.419	17.966	35.222	20.661	7.197	1.804	N.S.
4	$V_{X-T}$	29.326	9.293	23.463	12.281	5.863	2.593	.05
5	$V_{O-T}$	21.837	10.902	15.815	10.599	6.022	2.744	.05
6	$V_{Cy-T}$	93.256	38.058	74.426	42.512	18.830	2.268	.05
7	$NV_{F-T}$	28.186	8.958	30.555	9.224	-1.369	1.273	NS
8	Att.Sc.	49.323	8.914	48.944	6.367	0.379	0.245	NS
9	Factor B	8.116	1.721	7.704	1.238	0.412	1.372	NS
10	D	10.837	3.618	10.185	3.053	0.652	0.962	NS
11	G	11.791	3.020	12.407	2.764	-0.616	1.047	NS
12	H	10.163	4.304	11.574	3.931	-1.411	1.679	NS
13	J	9.558	2.519	9.093	2.967	0.465	0.820	NS
14	Eco.	45.0580	8.6155	50.643	9.1960	-5.5575	1.961	.05
15	Sect.	47.630	8.6017	50.663	10.9753	-3.033	1.481	NS
16	Ot.dr.Phy	44.841	11.510	52.042	9.163	-7.201	3.441	.01
17	Sci	53.4280	9.3562	50.1144	10.0963	3.3136	1.658	NS

High intelligence accounts for superior problem solving abilities, affective work habits; independent thinking and desirable behaviour characteristics. Voluminous research work in the past has established that intelligence was basic for any excellent performance in any field. Hollingworth and Cobb(1923)



Terman and others (1925); Carrell (1930); Sanford (1952) Wedemeyer (1953) and several others have reported that superior intelligence was associated with high achievement. Awardees scored significantly higher on non-verbal intelligence and verbal creativity, thereby <sup>constituting</sup> a group of double-talented subjects. Where as Group III performed better only on verbal intelligence (single talented). It has been found that double-talented subjects (highly creative and intelligent ) were better than the single talented (highly intelligent or highly creative) and no talented (low creative, low intelligent) . Studies by Yammanto (1960), Getzels (and Jackson (1961) Rambo (1964) and Atenhaus (1964) supports the above view.

As regards, interest, Group III was more interested in outdoor physical activities (like fishing, games etc.) and economics. Taste in outdoor physical activities, it seems puts restriction of time on students to make full use of their verbal intelligence, and keep themselves well versed with latest advancements in scholastic fields taken into account in the tests administered by NCERT. Interest in economics was not of much help to these students as items selected for economics in SAT constituted only ten per cent area and are chiefly concerned with the knowledge rather than the interest. As would be seen in next-section, correlation of interest in economics has been reported to be low negative (-.158) with SAT.

Awardees and Group IV (who did not appear in NTS examination):

Insignificant differences were found between groups I and



IV (vide Table 3.5) on variables of verbal intelligence,<sup>36</sup> scientific attitude, and on personality traits J,H,D. Awardees scored significantly higher on non-verbal intelligence ( $M_1=56.372$ ;  $M_4=47.386$ ); on all the four dimensions of verbal creativity ( $V_{F-T}$   $t=3.425$ ;  $V_{X-T}$   $t = 4.48$ ;  $V_{O-T}$   $t=5.02$ ;  $V_{Cy-T}$   $t = 4.21$ ) and on personality characteristics represented by B and G of HSPQ ( $t = 2.64$  and  $2.00$  respectively) as also for interest in science but scores on interest in outdoor physical activities ( $M_1=44.841$ ;  $M_4=52.394$ ), economics ( $M_1=45.058$ ,  $M_4=53.57$ ) and fluency totals on non-verbal creativity ( $M_1=28.186$ ,  $M_4=32.659$ ) were significantly in favour of group four.

Table 3.5: t-ratios between Group I and IV for the variables of verbal and non-verbal intelligence,  $V_{F-T}$ ,  $V_{X-T}$ ,  $V_{O-T}$ ,  $V_{Cy-T}$ ,  $NV_{F-T}$ , attitude towards science, interest in economics, secretariate, outdoor physical activities and scientific and for the traits B,D,G,H and J.

S. No.	Name of the Variable	Group I		Group IV		Mean & Diff.	t-value
		Mean	SD	Mean	SD		
1	v Int	68.837	26.377	76.977	14.806	-8.144	1.780
2	NV Int	56.372	2.870	47.386	10.52	8.986	5.414**
3	$V_{F-T}$	42.419	17.966	29.910	16.059	12.509	3.425**
4	$V_{X-T}$	29.326	9.293	20.432	9.214	8.894	4.481**
5	$V_{O-T}$	21.837	10.902	12.023	6.933	9.814	5.021**
6	$V_{Cy-T}$	93.256	35.058	61.910	31.014	31.346	4.213**
7	$NV_{F-T}$	28.186	8.958	32.659	8.548	-3.473	2.382*

table contd:...



Table 3.5 contd:

S. No.	Name of the Variable	Group I		Group IV		Mean Diff	t-value
		Mean	SD	Mean	SD		
8	Att.Sc	49.323	8.914	45.477	14.614	4.846	1.478
9	Eco	45.058	8.616	53.571	10.580	-8.513	3.130**
10	Sect	47.636	8.602	52.994	11.046	-5.358	2.51**
11	Ot dr Phy Act	44.841	11.510	52.394	7.756	-7.553	3.568**
12	Sc.	53.428	9.356	45.203	9.768	8.225	3.988**
13	B	8.116	1.721	6.932	2.396	1.184	2.642**
14	D	10.837	3.618	10.795	3.638	0.042	0.054
15	G	11.791	3.020	10.523	2.873	1.268	2.00*
16	H	10.163	4.304	10.091	3.588	0.072	0.085
17	J	9.558	2.519	9.068	2.654	0.490	0.883

The high score of Group I on non-verbal intelligence ( $M_1=56.372$ ;  $M_4=47.386$ ) is further supported by its significantly favourable means on factor B of HSPQ ( $M_1=8.116$ ,  $M_4=6.932$ ). High score on B is related to high intelligence and abstract thinking, more persistence and better school interest. Performance of awardees was also found to be outstanding. On all the dimensions of verbal creativity indicating double talentedness of subjects (both in verbal intelligence and creativity) who have been selected through NTS examination.

Scholarship winners have also been found to be interested in field of science, which is related to physics, chemistry and mathematics, items on which cover about thirty-six per cent of SAT items, while Group IV interested more in economics which



constitutes only ten per cent items. Group IV interest in outdoor physical activities seems to have exhausted much of its time leaving it with little time to attend to academic subjects.

Along with the personality trait B (discussed earlier) Group I also scored higher on the characteristic G ( $M_I=11.791$ ,  $M_{IV}=10.523$ ). High score on G indicates a person to be guardian of manners, has ability to concentrate, emotionally disciplined, responsible, planful and preferring efficient people to other companions. Awardees were endowed favourably with this personality trait, which might have helped them in getting through the NTS examinations. Pearce (1968) too has characterized talented students to be significantly better on  $B^+$ ,  $G^+$ ,  $D^-$ ,  $H^+$ ,  $I^+$ ,  $J^+$ ,  $Q^-$ ,  $Q_2^+$ ,  $Q_3^+$  and  $Q_4^-$ .

The research fellow observed during her data collection that even some school authorities were not much aware of these nation-wide tests. So it seems children of such schools having delinquent tendencies ( $G^-$ ) and interested in time consuming outdoor physical activities could not have the proper information and guidance for taking NTS examinations.

Group II (rejected in interview) and III (who could not qualify written test):

Results in Table 3.6 demonstrate insignificant t-ratios for intelligence (verbal and non-verbal); different interests; and on all the factors of HSPQ except for the factor J (Zeppia-Coasthenia,  $t=2.35$ ),  $M_2=7.419$ ,  $M_3=9.09$ ; and various dimensions of verbal creativity namely  $V_{F-T}$  ( $t=3.889$ );  $V_{X-T}$  ( $t=2.185$ );  $V_{O-T}$  ( $t=2.364$ ),  $V_{CY-T}$  ( $t=2.374$ ) and for attitude towards science ( $t=2.048$ ).



Table 3.6 : t-ratios between group II and III for the variables of verbal and non-verbal intelligence, V<sub>F-T</sub>, V<sub>X-T</sub>, V<sub>O-T</sub>, V<sub>Cy-T</sub>, NV<sub>F-T</sub>, attitude towards science interests in economics, outdoor physical activities, secretariate, scientific and for the traits B,D,G, H and J.

Sr. No.	Name of the variable	Group II		Group III		Mean Diff.	t-value
		Mean	SD	Mean	SD		
1	V Int	75.581	21.172	78.019	13.456	-2.438	0.649
2	NV Int	54.710	4.893	53.167	8.797	0.543	0.898
3	V <sub>F-T</sub>	46.419	20.670	35.222	20.661	11.197	2.404*
4	V <sub>X-T</sub>	29.097	9.769	23.463	12.281	5.635	2.185*
5	V <sub>O-T</sub>	21.645	11.519	15.815	10.599	5.830	2.364*
6	V <sub>Cy-T</sub>	96.645	39.723	74.426	42.512	22.219	2.374*
7	NV <sub>F-T</sub>	28.023	8.894	30.555	9.224	-2.523	1.229
8	Att.Sc	51.694	4.806	48.944	6.367	2.701	2.048*
9	Eco	48.007	11.005	50.643	9.196	-2.636	1.183
10	Sect	47.964	7.321	50.663	10.975	-2.699	1.221
11	Out dr Phy Act	50.277	9.825	52.042	9.163	-1.765	0.836
12	Sci	51.699	8.803	50.114	10.099	1.585	0.729
13	B	7.581	2.126	7.704	1.238	-0.123	0.338
14	D	9.032	2.689	10.185	3.053	-1.153	1.747
15	G	12.677	2.856	12.407	2.764	+0.270	0.428
16	H	11.742	3.966	11.574	3.931	0.168	0.188
17	J	7.419	3.472	9.093	2.967	-1.694	2.35*

Although some minimum level of intelligence is involved to solve any activity yet there is evidence that this is not the only factor in deciding the talented as was pointed out earlier in Section 1.2 of the report. Both the groups second and third



were equally intelligent but candidates qualifying written tests were superior in divergent thinking. This may also be understood in terms of double talentedness being superior to single talentedness, as already explained in discussing Group I and III.

Means for scientific attitude ( $M_{II}=51.645$ ,  $M_{III}=48.944$ ) as reported in Table <sup>3.6</sup> 4.6b; were significantly greater for group second as compared to group third. Scientific attitude for analyzing problems might have favoured group II subjects in qualifying written tests.

With regards to personality traits the low score on the factor J as obtained by the candidates of group II shows these subjects like to go with the group are vigorous and zestful. Though group III students scored higher on the factor J but group II being single talented and having positive attitude towards science performed better in written examination.

Group II (rejected in interview) and IV (who did not appear in the test:

Insignificant t-ratios have been reported (vide Table 3.7) for the variables of verbal intelligence and the traits, B,H. Group II subjects performed significantly better on non-verbal intelligence ( $t = 3.609$ ),  $V_{F-T}(t=3.889)$ ,  $V_{X-T}(t=3.911)$ ,  $V_{O-T}(t=4.507)$   $V_{Cy-T}(t=2.248)$  and the personality traits D (Phlegmatic-excitabile;  $t=2.29$ ), G(weak super ego-strong super-ego),  $t= 3.205$ ), J (Zeppia-Coasthenia,  $t = 2.33$ ).



Table 3.2: t-ratios between Group II and IV for the variables of verbal and non-verbal intelligence  $V_{F-T}$ ,  $V_{X-T}$ ,  $V_{O-T}$ ,  $V_{Cy-T}$ ,  $NV_{F-T}$ , attitude towards science interests in economics, outdoor physical activities, secretariate, scientific and for the traits B,D,G,H and J.

S. No.	Name of the Variable	Group II		Group IV		Mean Diff.	t-value
		Mean	SD	Mean	SD		
1	V Int	75.581	21.172	76.977	14.806	-1.396	.336
2	NV Int	54.710	14.893	47.386	10.502	7.324	3.609**
3	$V_{F-T}$	46.419	20.670	29.910	16.059	16.509	3.889**
4	$V_{X-T}$	29.97	9.769	20.432	9.214	8.665	3.911**
5	$V_{O-T}$	21.645	11.519	12.023	6.933	9.622	4.507**
6	$V_{Cy-T}$	96.645	39.723	61.910	31.014	34.755	4.248**
7	$NV_{F-T}$	28.023	8.894	32.659	8.548	-4.627	2.269*
8	Att Sc	51.694	4.806	45.477	14.614	3.467	2.261
9	Eco	48.007	11.005	53.571	10.580	-5.564	2.195*
10	Sect.	47.964	7.321	52.994	11.046	-5.030	2.208*
11	Out dr Phy.Act	50.277	9.825	52.394	7.756	-2.117	1.035
12	Sci	51.699	8.813	45.203	9.768	6.496	2.940**
13	B	7.581	2.126	6.932	2.396	0.549	1.208
14	D	9.032	2.689	10.795	3.638	-1.763	2.290*
15	G	12.677	2.856	10.523	2.873	2.154	3.205**
16	H	11.742	3.966	10.091	3.588	1.651	1.878
17	J	7.419	3.472	9.068	2.654	-1.649	2.133*



As pointed out earlier in comparisons of Group I and III, I and IV, II and III that the variables of intelligence, verbal creativity and personality traits  $G^+$ , attitude towards science, interest in science and less interest in economics and outdoor physical activities favoured in qualifying NIS examinations. Performance of group II also represents the similar trends as compared to group IV

However, Group II students scored less on the traits D ( $M_{II}=9.032$ ,  $M_{IV}=10.795$ ) and J ( $M_{II}=7.419$ ,  $M_{IV}=9.068$ ) showing they were deliberate, stodgy, self effacing ( $D^-$ ) and vigorous, accept common standards ( $J^-$ ). In contrast group IV subjects were over-active, self-assertive, impatient ( $D^+$ ). The characteristic  $G^-$  as possessed by Group IV is identified to be a trait of institutionalized delinquents (Pierson and Kelly 1963; Pierson, 1965; Pierson, Mosley and Olsen, 1967).

The synoptic comparative picture of performance of the four groups on these variables have been presented graphically (Fig.1-Fig.17) taking mean on the vertical axis.



FIG 1

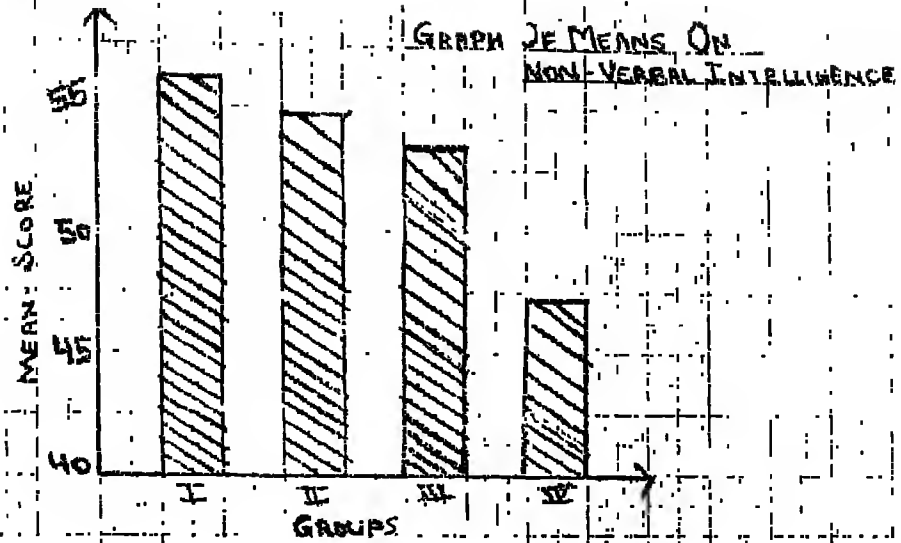


FIG 2

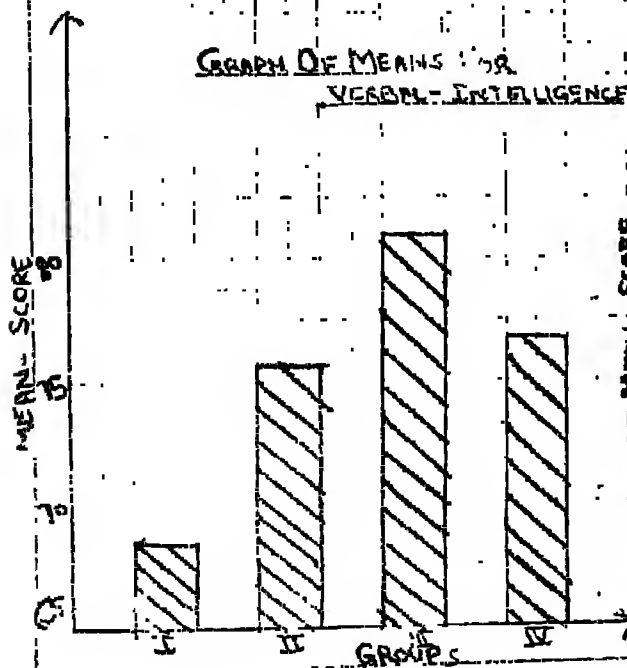


FIG 3

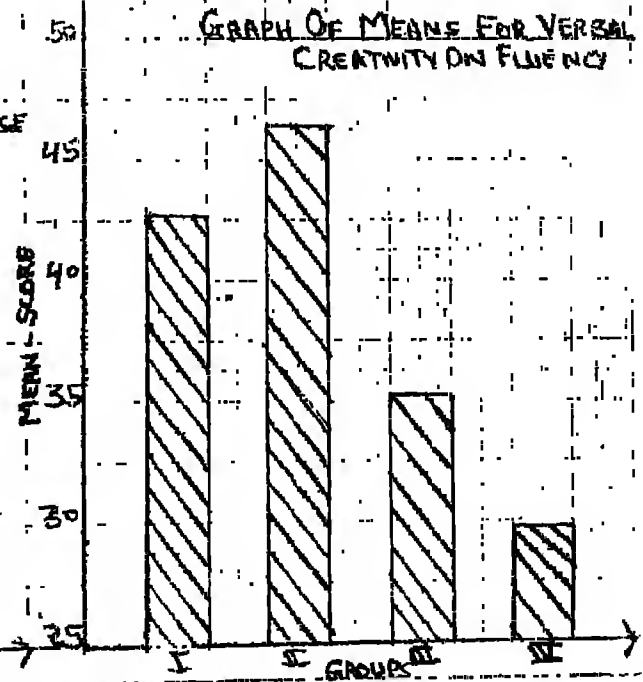




FIG. 4

GRAPH OF VERBAL CREATIVITY ON FLEXIBILITY

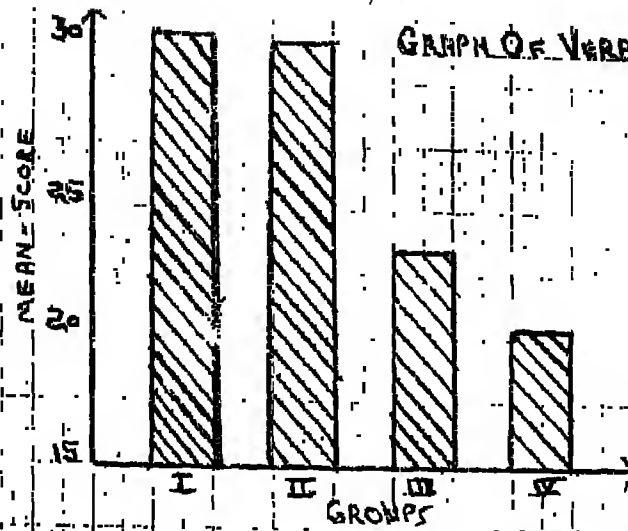


FIG. 5

GRAPH OF MEANS FOR VERBAL CREATIVITY ON ORIGINALITY

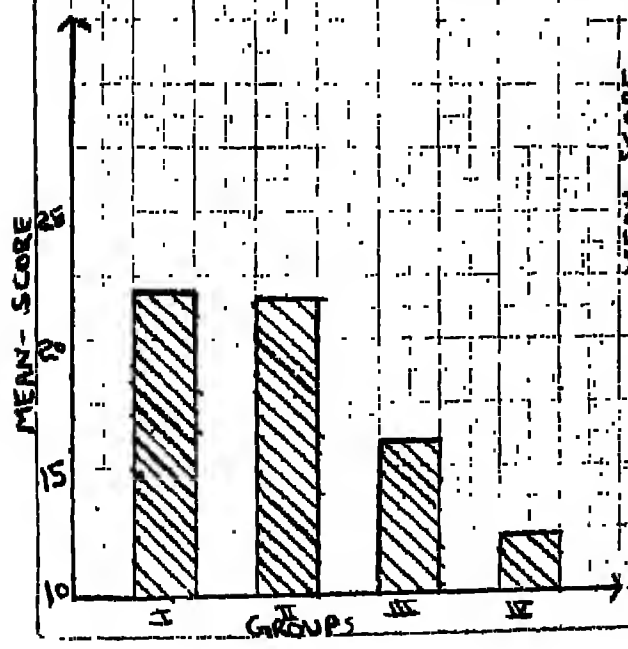


FIG. 6

GRAPH OF VERBAL CREATIVITY IN TOTAL

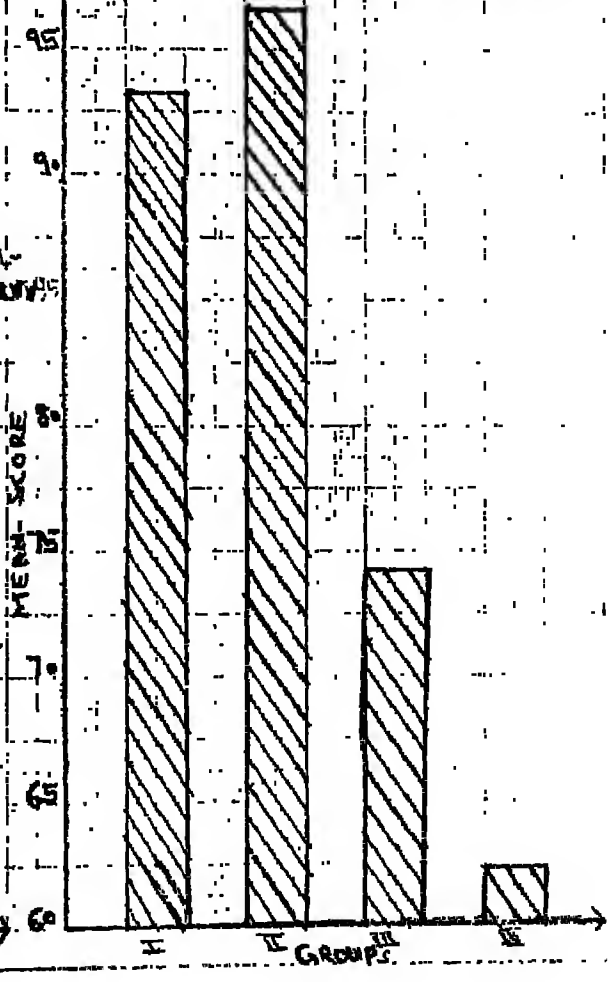




FIG. 7

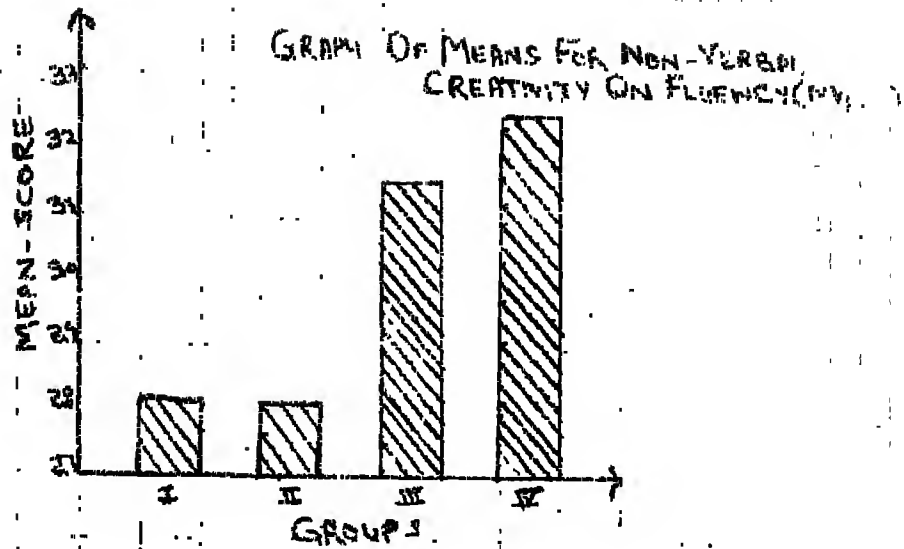


FIG. 8

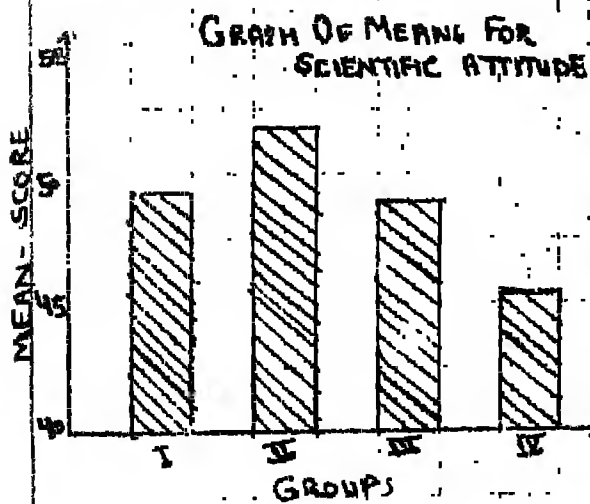


FIG. 9

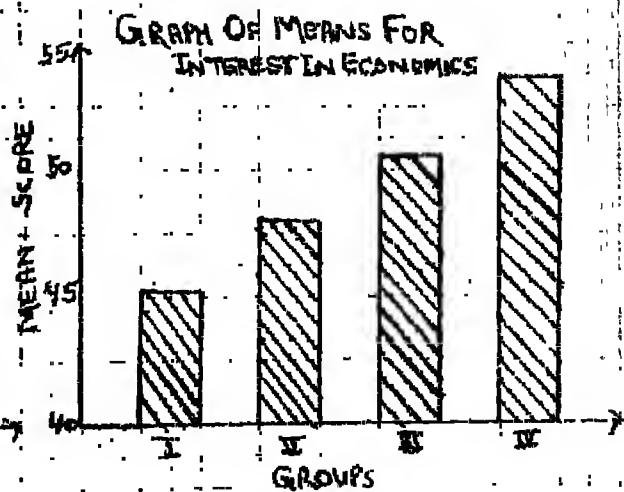




FIG-10

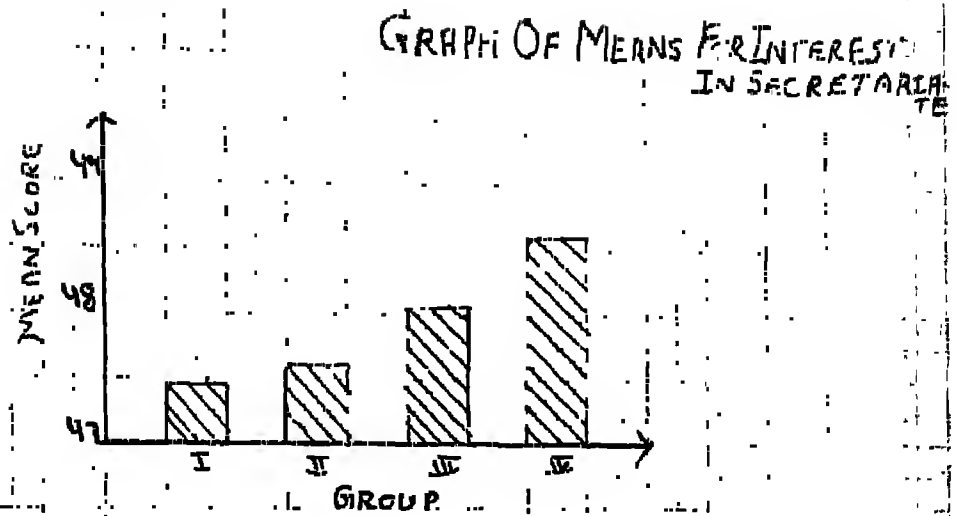


FIG-11

GRAPH OF MEANS FOR INTEREST IN OUT DOOR PHYSICAL ACTIVITIES

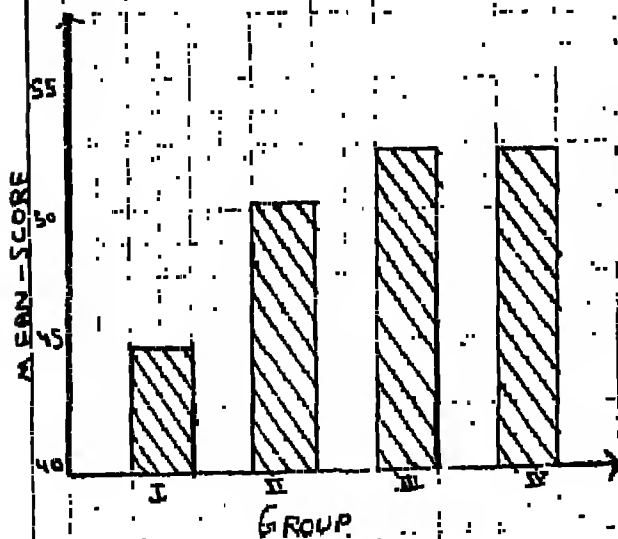


FIG-12

GRAPH OF MEANS FOR SCIENTIFIC INTEREST

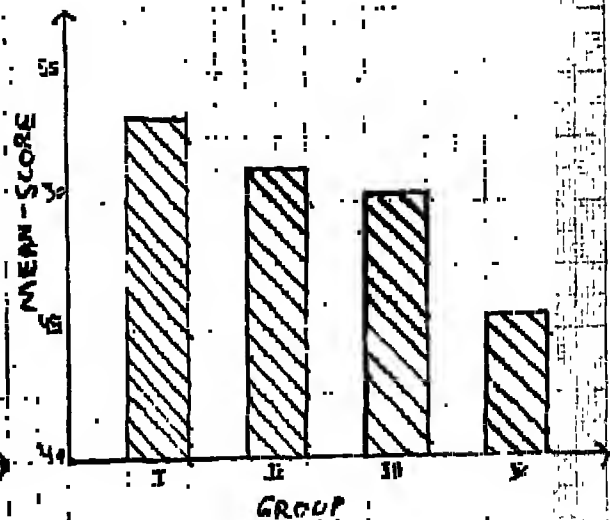




FIG. 13

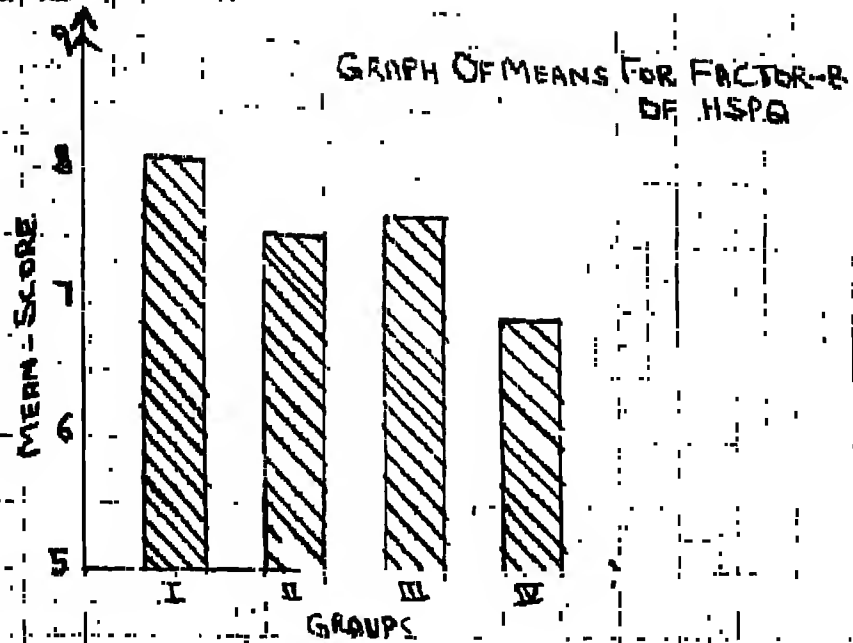


FIG. 14

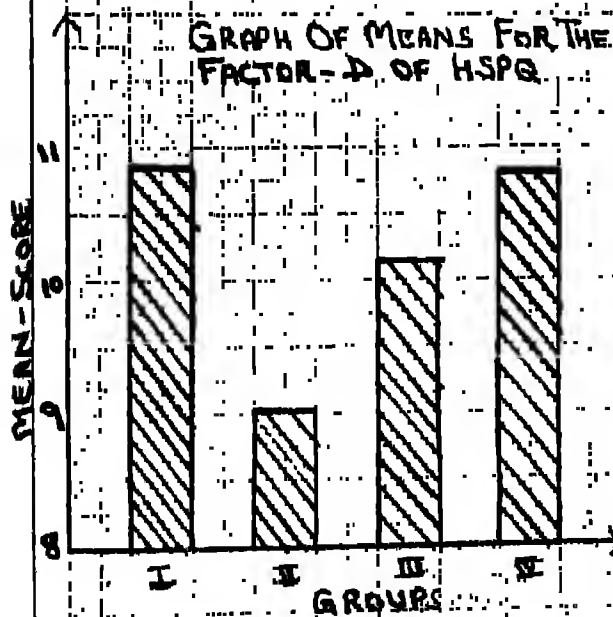


FIG. 15

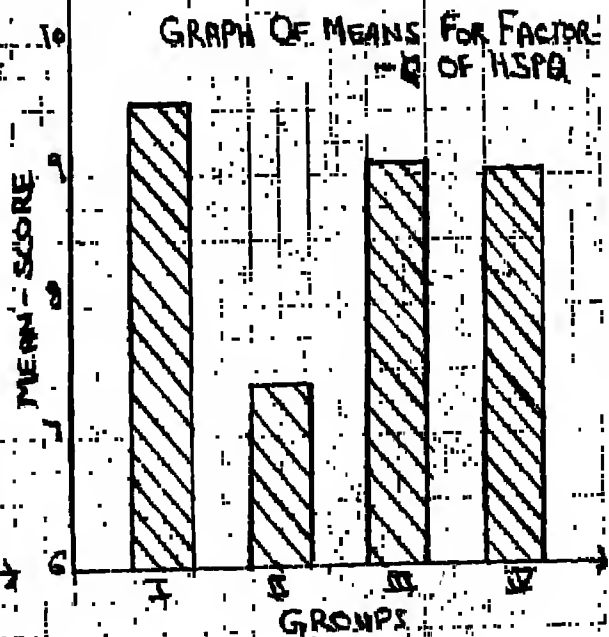




FIG 16.

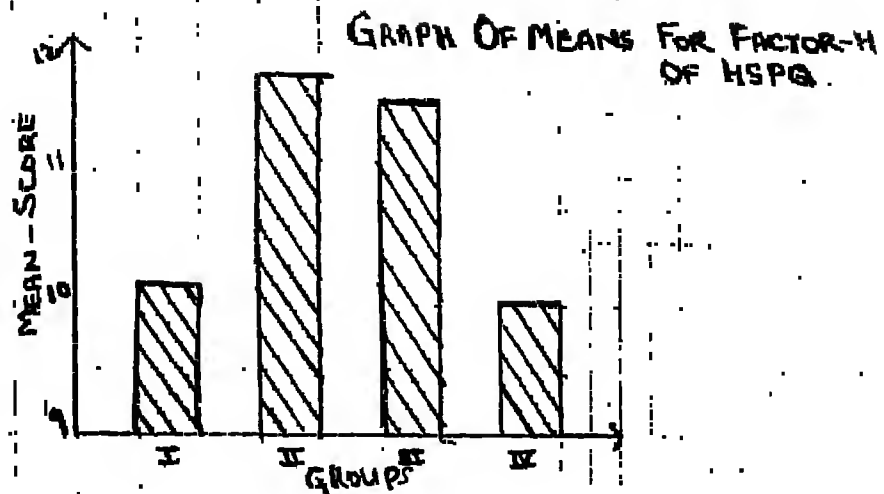
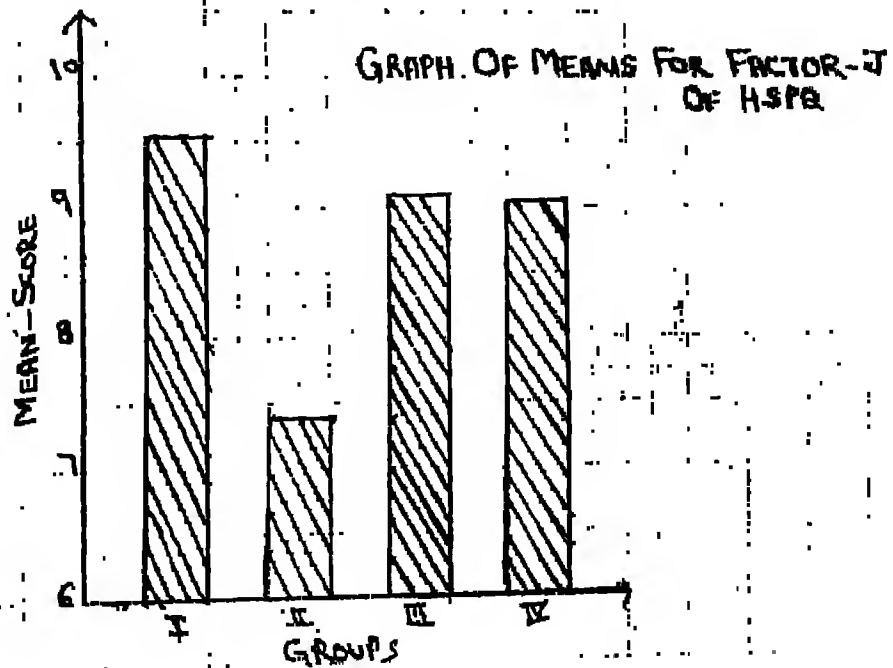


FIG 17





In the light of above discussion pertaining to the testing of mean differences in cognitive and non-cognitive correlates of NTS examination we can infer that:

- (1) Group I, the awardees and Group II, students who qualified written test but rejected in interview, did not exhibit any difference on the variables of verbal and non-verbal intelligence and creativity, attitude towards science, interest in economics, secretariate, scientific and on traits B, G and H except for interest in outdoor physical activities and trait D and J. Awardees were characterized to be reflective, intellectually and physically fastidious, self-assertive and over-active. These traits, it seems, have helped them a lot to get through interview successfully. While Group II more interested in time-consuming outdoor physical activities could not qualify the interview.
- (2) Group I, the awardees performed better than group III, the subjects who appeared in NTS examinations but could not qualify written examination, on the variables of non-verbal intelligence, flexibility, originality and creativity totals (verbal). While performance of group III was significantly better in verbal intelligence and for the interests in the areas of economics and outdoor physical activities. The awardees being double-talented (highly intelligent(non-verbal) and creative (verbal)) outperformed than the single



talented(intelligent(verbal)) group III. Moreover time consuming interest in outdoor physical activities of group III made their performance in written examination poor.

- (3) Group I, the awardees, scored higher than group IV students, who did not appear in the NTS examination, on the variables of non-verbal intelligence, on all the four measures of verbal creativity and factor B and G of HSPQ as also for interest in scientific area. However, scores on interest in outdoor physical activities, economics and fluency totals on non-verbal creativity were in favour of group IV. Awardees being double-talented in comparison to group IV and because of their possession of personality characteristics like ability to concentrate, preferring efficient people to other comparisons and interest in science might have helped them to appear and get through the NTS examination.
- (4) Group II (who were rejected after interview) outperformed on the traits J and D of HSPQ, various dimensions of verbal creativity and scientific attitude in comparison to Group III (who could not qualify written test). Although some minimum level of intelligence is involved to solve any activity yet there is evidence that this is not the only factor in deciding the talented as was pointed out earlier in Section 1.2. of the report. Both the groups—second and third were equally intelligent but candidates qualifying written tests were superior in divergent thinking. Scientific attitude and reflectivity trait has perhaps further favoured this group of students(II) for getting through the written examination conducted by



NTS Unit of NCERT.

- (5) Subjects qualifying written test (group II) outperformed group IV subjects (who did not appear in the test) on the variables of non-verbal intelligence, verbal creativity ( $V_{F-T}$ ,  $V_{X-T}$ ,  $V_{O-T}$  and  $V_{Cy-T}$ ) and the personality traits of D, G, J and for interests in the area of science. While Group IV students did better on non-verbal creativity and for interests in the areas of economics and outdoor physical activities. As pointed out earlier, in comparisons of Groups II and III, I and III, and I and IV that the variables of non-verbal intelligence, verbal creativity and personality traits like  $D^-$ ,  $G^+$ ,  $J^+$ ; scientific attitude and interest in scientific area and less interest for outdoor physical activities and economics favoured in qualifying NTS examinations. Performance of group second also represents the similar trends as compared to group fourth except for the trait J.
- (6) Thus in general non-verbal intelligence, and the four dimensions of verbal creativity namely --  $V_{F-T}$ ,  $V_{X-T}$ ,  $V_{O-T}$  and  $V_{Cy-T}$  are the valid variables and attitude towards science, traits B, G, D and J and interests in science, economics, outdoor physical activities and secretariate are the the potential variables of selection criteria in National Talent Search Examination.



## RESULTS AND DISCUSSION- II

Cognitive and Non-cognitive correlates of measures employed in NTS examination

In order to further test the validity of cognitive and non-cognitive correlates against NTS examination scores as already identified through analysis of variance (design) on the measures of verbal and non-verbal intelligence; four dimensions of verbal creativity namely -- fluency, flexibility, originality totals and summative total, fluency totals of non-verbal creativity, scientific attitude; personality traits of B,D,H,G,J as also for interests in science, economics, outdoor physical activities, secretariate were correlated with each of the three NTS examination scores that is scores on --GMA, SAT and interview for awardees and those ~~of~~ who were rejected after interview. Results of these ~~have~~ have been entered in Table 4.1.

The total number of correlations thus obtained, were fifty-seven. Out of these correlations only ten correlations were significant at .05 level whereas only one correlation was significant at .01 level. And the rest of them were insignificant.

#### 4.1 Cognitive Correlates of NTS examination:

Intelligence:

Verbal Intelligence: Results indicated in Table 4.1 reflect very <sup>low</sup> positive correlation of verbal intelligence with GMA indicating thereby, that GMA used as a measure of intelligence in NTS examinations does have only negligible commonness with



Table 4.1 : Correlations between predicted variables of intelligence, creativity and motivational with each of the three NTS examination scores.

53

S. No.	Name of the variable	Correlations with NTS examination		
		GMA	SAT	Int
1	V <sub>Int</sub>	.005	.071	.251*
2	NV <sub>Int</sub>	.055	-.109	-.245*
3	V <sub>F-T</sub>	.132	-.319**	-.062
4	V <sub>X-T</sub>	.257*	-.240*	.054
5	V <sub>O-T</sub>	.174	-.264*	-.023
6	V <sub>Cy-T</sub>	.220	.070	.160
7	NV <sub>F-T</sub>	.204	-.118	.072
8	AtSc	.177	-.196	-.048
9	Eco	.031	-.158	-.077
10	Sec	.073	-.136	.059
11	OdPhAct	.063	-.165	-.122
12	Sc	-.119	.277*	.098
13	B	.104	.036	.148
14	D	.197	.031	.279*
15	G	-.130	.078	-.118
16	H	.053	-.179	-.147
17	J	-.110	.309*	.272*

\* Significant at .05 level

\*\* Significant at .01 level.



54

the standardized test of verbal intelligence (Jalota, 1963) taken in the study, the possible reasons may be looked into the nature of GMA (locally developed-- unstandardized)

SAT scores, too have been observed to be insignificantly related with verbal intelligence. This implied that high intelligence was not a promise to high academic achievement, as measured by SAT in NIS examinations. This is understandable because SAT is aimed to measure more of performance in the subject areas chosen by the candidate.

With interview, significant positive correlation of verbal intelligence have been observed. It means that candidates good in verbal intelligence performed well in interview. It might be because verbal intelligence is related to the abilities of reasoning, best answers and vocabulary etc. have enabled the subject to express themselves more correctly and rationally in the best suited manner.

#### Non-verbal Intelligence:

Low positive correlation between GMA score and non-verbal intelligence and low negative correlation of SAT with non-verbal, and significant negative correlation of interview score with non-verbal intelligence were found as demonstrated in Table 4.1. Low negative correlation of SAT with non-verbal intelligence was obviously due to objective type items of SAT which were completely divorced from the questions calling for apprehension of meaningful figures or requiring relations within abstract figures.



Interview score <sup>was</sup> ~~significantly~~ <sup>it</sup> negatively correlated with non-verbal intelligence/was perhaps because questions asked in interview required knowledge of academic subjects and ability to express the same efficiently.

#### Creativity:

GMA has been reported to be significantly correlated with  $V_{X-T}$  and positively though not significantly with the other dimensions of verbal and non-verbal creativity namely fluency, originality and summative totals and fluency totals of non-verbal creativity. This stresses the need for including creativity test separately for determining Talent.

It is obvious from the correlations given in Table 4.1 that scores on SAT exhibited significant negative correlation with fluency, flexibility and originality totals on verbal creativity. It seems that the performance of candidates endowed with flexible and original ideas was poor on SAT. This might be because SAT being objective and knowledge-bound, left little scope for the expression of new divergent ideas. On the other hand it imposed restriction on divergent/original responses as the candidates were supposed to mark one and the specific answer for a specific question.

Insignificant positive or negative correlations of interview have been reported with all the dimensions of verbal and non-verbal creativity. These results lead us to infer that creative persons could hardly take any advantage of their ability. Possibly, because questions asked in the interview



were divorced from the essence of provoking divergent thinking. Instead they were factual type. High positive correlation of SAT and interview (.39) further stamps up that the questions asked in the interview were more of academic nature.

#### 4.2 Non-Cognitive Correlates of NTS Examinations:

##### I. Motivational:

##### (a) Scientific Attitude:

Low positive or negative correlations of attitude towards science have been reported with all the three NTS examination scores. Attitude towards science which is a potential variable for identifying talented students, should also be measured especially for students opting science subjects either by adding one separate test or by incorporating few items related with it.

##### (b) Interests:

Interests for the fields of economics, secretariate, outdoor physical activities, and science have low positive or negative correlation with all the three NTS examination scores except for the correlator between scientific interest and SAT score (.277). Insignificant<sup>negative</sup> correlations for interests in economics, secretariate and outdoor physical activities have been reported (-.158, -.136 and -.165 respectively) with SAT. This indicates that activities involved in these fields tend to lower down SAT score either because of low percentage of items in SAT of that field, or because of time consuming nature of that interest.



Factors B, D, G, H and J have low positive or negative correlation with NTS examination scores except for the correlations between the trait D and interview score (.279), trait J and SAT score (.309) and trait J and interview (.272).

The characteristic 'B' related to intelligence and abstract thinking, was expected to be positively correlated with the GMA, insignificant correlation (.104) was possibly because of nature of GMA test (locally developed, unstandardized).

The characteristic B dealing with intelligence was expected to have low correlation with SAT, as the latter was performance oriented. The trait J (Zeppia-Coasthenia) has been reported to be significantly positively correlated with SAT score, thereby implying that the abilities like intellectually fastidious, reflectivity have favoured these candidates <sup>including</sup> ~~including~~ them to consult best possible material for appearing in NTS examination.

Likewise the factors D (Phlegmatic-excitabile) and J (Zeppia-Coasthenia) have been found to be significantly positively correlated with interview score. The characteristics like like excitabile, self-assertive, over active (D+) and reflectivity (J+) have helped the candidates in taking up interview with confidence so as to assert their point of view in face to face situation evoked by interviews.

As these traits namely B, D, G, H and J are potential variables in identifying Talent thus either questions related to



these traits may be incorporated in the tests or schools should take the responsibility of training students on the<sup>se</sup> traits.

#### IV Socio-Economic Status:

All the socio-economic correlates namely - educational occupational and social status of the family, per capita income and total socio-economic status were also correlated with NTS examinations (Table 4.2). As contribution of these variables to NTS examination remain controversial issue, correlations on these sub-scales with all the three NTS scores were worked out to check trend of effect of these variables.

Table 4.2: Correlations of NTS examination (GMA, SAT and Int) with Socio-Economic Scale.

S.No.	Name of the Variable	Correlation with NTS score in		
		GMA	SAT	Int
1	SES <sub>Ed</sub>	.110	.259*	.292**
2	SES <sub>OCC</sub>	.145	.057	.172
3	SES <sub>Inc</sub>	.107	-.026	.227
4	SES <sub>SS</sub>	-.162	.114	.136
5	SES <sub>T</sub>	.066	.116	.204

Insignificant positive or negative correlations have been reported between all the sub-scales of socio-economic status and NTS examination scores except for the correlations of SES<sub>Ed</sub> with SAT score (.259) and interview score (.292). This would mean that candidates with low educational level of the family did not perform well on written test (SAT) and in interview.



Raina (1976,1977) in his background study on NSTS (National Science Talent Search) examinations, too has observed that the average educational level of the family of those who were rejected for both the written tests and interview. It seems that educability of the family could provide their youngsters with better guidance and healthy environment by directing them appropriately in respect of skills needed in academic performance as also their style of expression.

The following inferences can be drawn from the above discussion:

- (1) Verbal and non-verbal intelligence had very low positive or negative correlations with GMA and SAT scores but with interview verbal intelligence was significantly positively correlated (.251) and with non-verbal intelligence significantly negatively correlated (.245) verbal intelligence related with reasoning, best answers and vocabulary help the students to express rationally in interviews, while students rich in non-verbal intelligence fail to do full justice with the interview.
- (2) Non-verbal creativity was positively or negatively correlated with all the three NTS scores. While various dimensions of verbal creativity namely  $V_{F-T}$ ,  $V_{X-T}$  and  $V_{O-T}$  were negatively correlated with SAT, the correlation of  $V_{K-T}$  and GMA was positive. All other correlations of verbal creativity and NTS examination scores were low positive or negative SAT being objective type and knowledge bound, left little scope for the expression of new divergent ideas, On the



other hand it imposed restriction on divergent original responses as the candidates were supposed to mark one and the specific answer for a specific question.

(3) Attitude towards science had low positive or negative correlation with three NTS examination scores.

(4) Interests in economics, secretariate, outdoor physical activities and scientific had low positive or negative correlations with NTS examination scores except for the correlation between interest in science and SAT score. This was due to the fact that SAT had high concentration of items related to science.

(5) Traits B,D,G,H and J had low positive or negative correlations with all the three NTS examination scores except for the the positive correlations between trait D and interview, and J with interview and SAT. Traits like excitable, self-assertive (D+) and reflective. physically and intellectually fastidious (J+) facilitated the students<sup>to</sup>/fair well in SAT and interview.

(6) Educational status of the family had significant positive correlation with SAT and interview score. It seems that educibility of the family can provide their youngsters with better guidance and healthy environment by directing them appropriately in respect of skills needed in academic performance as also their style of expression.



SUMMARY, CONCLUSIONS AND SUGGESTIONS

Identification and nurturing of Talent, has been the outcome of two major world trends: to explore natural resources through best of the human resources (talented persons) in diverse areas of human activity such as medicine, engineering, agriculture etc. and to cultivate an aesthetic climate through talented products such as painting, music, poetry and the like to nullify the effects of the stresses and strains of the highly complex technology.

For these reasons identification and nurturing of talent has remained a major concern in all the progressive countries. In India, National Council of Educational Research and Training undertook a programme of talent search in science soon after its establishment in 1961. A pilot project was tried in Union Territory of Delhi in 1963. Ten scholars were selected and placed in leading colleges to have further education. The scheme was then extended to the entire country in 1964 and since then upto 1976 a maximum of 350 scholarships were awarded to brilliant scholars who demonstrated a specific aptitude for basic sciences. From 1977, onwards, frontiers of the scheme have extended whereby the selected students have the option of joining either engineering, medicine or social science or basic science or agricultural science courses. Longitudinal follow-up results have indicated that the selected scholars are a class of brilliant students possessing not only well defined higher



mental abilities, specific aptitude in science, but also a well balanced personality with adequate social adjustment.

As criterion is the yardstick by which other measures tentatively advance as predictor or manipulators are evaluated, so establishment of criteria is fundamental problem in this field. Sub-Committee (set up by NCERT) has tried to give comprehensive definition of Talent. It reads as "Talent is a potentiality that manifests itself in a level of socially relevant performance in one or more specialized areas. Such potentiality may be indicated by a pattern of intellectual psychomotor motivational and personality characteristics related to socio-cultural environment" (Ref. Review Committee, p.9).

Voluminous research work in the past has established that talented performance depends to a great extent on intelligence (Hollingworth and Cobb, 1923; Terman and others, 1925; Carrel, 1930; Sanford, 1952; Wedemeyer, 1953; Gowan, 1955; Hammond and Cox, 1967). Scores on intelligence test has been the most popular method for the designation of giftedness/talented in the past.

It is only very recently that the need for other factors than intelligence, which may help in identifying talented has been felt. Getzel and Jackson (indicated that determination of giftedness from an I.Q. score alone may eliminate many creative individuals who are potentially superior. Some supporting data are shown in the thirty-five years follow-up of the Terman group (1954). Creativity involves the capacity to invent and innovate, whereas intelligence



requires the reproduction of the already learnt material (Guilford, 1950; Guilford and Chislein, 1958; Merrifield, 1960; McCuine et al. (1961), Sultan (1962), Jackson (1962), Torrance (1963), (1963), Anderson (1964) and Cropley (1965, 1966).

The significance of non-cognitive factors in identifying the special characteristics of the gifted/talented has been recognized by Terman (1954) and Jackson (1962). Intellectually or creatively talented individuals have unique personality characteristics conducive to worthwhile production. For any potential 'Talent' to be expressed in product, the importance of motivation cannot be denied. And interest has also been obtained as a potent-factor by different studies (O'Shea, 1968; and Katz and Morris, 1972). The social environment in which a child grows, has a decisive influence on the development of any potential. Studies by Rivlin (1959), Nuss (1961) and Hudson (1966) indicate that high creative generally come from higher socio-economic class-groups.

The present project attempted to explore such variables as could serve the best possible criteria in identifying the National Talent. The objectives of this study were:

1. To study the differential pattern of variables related to selected and non-selected groups in N.T.S. examination.
2. To study the relationship of intellectual personality and motivational variables as identified potential for discriminating.



awardees and non-awardees with performance on NTS procedures, so as to ascertain the validity of these variables.

3. To give suggestions as to which of the variables may be taken care of in NTS examinations so as to increase the reliability and validity of NTS examinations.

#### Design:

For the first part of the study, simple one way analysis of variance design was used and for the second part, a correlational design was used.

#### Sample:

It consisted of four groups namely (i) awardees (N=43), (ii) who qualified written test but were rejected in interview (N=31) (iii) who could not qualify written (N=54), and (iv) who did not appear for the test (N=45).

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#### Tools

Following tools were used for data collection:

- (1) Test of General Mental Ability (Jalota, 1963), Hindi Version.
- (2) Standard Progressive Matrices (Raven, 1958).
- (3) Torrance Test of Creative Thinking (Verbal Form I, 1966).
- (4) Torrance Test of Creative Thinking (Figural Form II, TTCT; 1966).
- (5) Test of Attitude Towards Science (Michael, Ford II).



- (6) ~~NCEERT~~ Interest Inventory (~~NCEERT~~) First fifty questions of senior form and first fifty of junior form)
- (7) Test of Achievement Motivation and Anxiety Inventory (Pryag Mehta, 1976 ).
- (8) Eysenck Personality Inventory (Eysenck<sup>and</sup> Eysenck, 1964).
- (9) Jr.Sr.High School Personality Questionnaire (Cattell, 1963).
- (10) Dev Mohan's Socio-Economic Scale (1972).

### Results and Conclusions:

- (1) Group I, the awardees and Group II, students who qualified written test but rejected in interview, did not exhibit any difference on the variables of verbal and non-verbal intelligence and creativity, attitude towards science, interest in economics, secretariate, scientific and on traits B, G and H except for interest in outdoor physical activities and trait D and J. Awardees were characterized to be reflective, intellectually and physically fastidious, self assertive and over-active. These traits it seems have helped them a lot to get through interview successfully, while group II more interested in time-consuming outdoor physical activities could not qualify the interview.
- (2) Group I, the awardees performed better than group III, the subjects who appeared in NTS examination but could not qualify written examination on the variables of non-verbal intelligence, flexibility, originality and creativity totals (verbal), while performance of Group III was significantly better in verbal intelligence and for the



interests in the areas of economics and outdoor physical activities. The awardees being double-talented (highly intelligent (non-verbal) and creative (verbal) ) outperformed the single talented (intelligent (verbal)) group III. Moreover, time consuming interest in outdoor physical activities of Group III made their performance in written examination poor.

- (3) Group I, the awardees scored higher than group IV students, who did not appear in the NTS examination, on the variables of non-verbal intelligence, on all the four measures of verbal creativity and factor B and G of HSPQ as also for interest in scientific area. However, scores on interest in outdoor physical activities, economics and fluency totals on nonverbal creativity were in favour of group IV. Awardees being double-talented in comparison to group IV and because of their possession of personality characteristics like ability to concentrate, preferring efficient people to other companions and interest in science might have appeared and got through the NTS examination.
- (4) Group II (who were rejected after interview) outperformed on the traits J and D of HSPQ. Various dimensions of verbal creativity and scientific attitude in comparison to Group III (who could not qualify written test). Although



some minimum level of intelligence is involved to solve any activity yet there is evidence that this is not the only factor in deciding the talented as was pointed out earlier in Section 1.2 of the report. Both the groups second and third were equally intelligent but candidates qualifying written tests were superior in divergent thinking. Scientific attitude and reflectivity trait has perhaps further favoured this group of students(II) for getting through the written examination conducted by NTS Unit of NCERT.

- (5) Subjects qualifying written test (group II) outperformed group IV subjects (who did not appear in the test) on the variables of non-verbal intelligence, verbal creativity ( $V_{F-T}$ ,  $V_{X-T}$ ,  $V_{O-T}$  and  $V_{CY-T}$ ) and the personality traits of D, G, J and for interest in the areas of science. While group IV student did better on non-verbal creativity and for interests in the areas of economics and outdoor physical activities. As pointed out earlier, in comparisons of Groups II and III, I and III, and I and IV, the variables of non-verbal intelligence, verbal creativity and personality trait like  $D^+$ ,  $G^+$ ,  $J^+$ ; scientific attitude and interest in scientific area and less interest for outdoor physical activities and economics favoured in qualifying NTS examinations. Performance of group second also represents the similar trends as compared to group fourth except for the trait J.



- (6) Thus in general non-verbal intelligence, and the four dimensions of Verbal creativity namely -  $V_{F-T}$ ,  $V_{X-T}$ ,  $V_{O-T}$  and  $V_{Cy-T}$  are the valid variables and attitude towards science, traits B, G, D and J and interests in science, economic, outdoor physical activities and secretariate are the potential variables of selection criteria in National Talent Search Examination.
- (7) Verbal and non-verbal intelligence had very low positive or negative correlations with GMA and SAT scores but with interview verbal intelligence was significantly positively correlated (.251) and with non-verbal intelligence significantly negatively correlated (.245) verbal intelligence related with reasoning, best answers and vocabulary help the students to express rationally in interviews, while students rich in non-verbal intelligence fail to do full justice with the interview.
- (8) Non-verbal creativity was positively or negatively correlated with all the three NTS scores. While various dimensions of verbal creativity namely -  $V_{F-T}$ ,  $V_{X-T}$  and  $V_{O-T}$  were negatively correlated with SAT, the correlation of  $V_{X-T}$  and GMA was positive. All other correlations of verbal creativity and NTS examination scores were low positive or negative. SAT being objective type and knowledge bound, left little scope for the expression of new divergent ideas. On the other hand it imposed restriction on divergent original responses as the



candidates were supposed to mark one and the specific answers for a specific question.

- (9)✓ Attitude towards science had low positive or negative correlation with three NTS examination scores.
- (10) Interests in economics secretariate, outdoor physical activities and scientific had low positive or negative correlations with NTS examination scores except for the correlation between interest in science and SAT score. This was due to the fact that SAT had high concentration of items related to science.
- (11)✓ Trait B,D,G,H and J had low positive or negative correlations with all the three NTS examination scores except for the positive correlations between trait D and interview, and J with interview and SAT, Trait like excitable self assertive (D+) and reflective, physically and intellectually fastidious (J+) facilitated the students fair well in SAT and interview.
- (12) Educational status of the family had significant positive correlation with SAT and interview score. It seems that educability of the family can provide their youngsters with better guidance and healthy environment by directing them appropriately in respect of skills needed appropriately in respect of skills needed in academic performance as also their style of expression.



Since the study was exploratory and was limited to the sample of Union Territory of Delhi only, so the underlying suggestions may need further consideration if the study be extended to other parts of the country:

- (1) Creativity being a potent factor in identifying talent, some items on verbal and non-verbal creativity or one separate test to assess divergent thinking should be incorporated in NTS procedures.
  - (2) Attitude towards science should also be measured by including some of the items on it.
  - (3) Number of items for the field of economics in SAT be increased to do full justice with the students interested in economics.
  - (4) Personality traits like B,D,G,H and J be measured by including some items related to them and schools should take the responsibility for providing environment to students to improve upon these characteristics in particular. These traits can also be given due consideration in interview.
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